TARGHEE
ENVIRONMENTAL CONSULTING

March 13, 2008

Ms. Rachel N. Loftin
Remedial Project Manager
U.S. EPA, Pacific Southwest Region
Superfund Division, SFD-7-4
75 Hawthorne Street
San Francisco, CA 94105

Re: January 19, 2007, EPA Comments on "Groundwater Sampling and Analysis Plan - Penrose, Newberry, and Strathern Landfills, Los Angeles, County, Sun Valley California 91352

Dear Ms. Loftin:

Comments dated January 19, 2007 regarding the January 4, 2007 Sampling and Analysis Plan ("SAP") and Quality Assurance Project Plan ("QAPP") were received via e-mail. The purpose of this letter response is to gain final approval of the SAP and QAPP for groundwater monitoring activities at the landfills.

As you requested, to aid in your review of the January 24, 2007 revised SAP/QAPP, the January 19, 2007 comments (bold) followed by the response are as follows:

Comment:

1) As previously discussed and agreed upon, a Well Reconnaissance and Rehabilitation Workplan is required for EPA review....

Response:

The well reconnaissance and rehabilitation was resolved in January 2007.

Comment:

2) Regarding the management of Inspection Derived Waste, the clarification regarding the anticipated water volume and use of holding tanks with a capacity of 10,000 to 20,000 gallons each, is an acceptable back up plan.

Response:

No response necessary.

Comment:

3) The EPA approved analytical method for 1,4-dioxane is 8270-SIM (single-ion monitoring) rather than 8270. The EPA approved analytical methods for 1,2,3-TCP are EPA Method 524.2-SIM or 8270-MOD. While the detection limit for 1,4-dioxane has been revised, it is unclear whether the originally proposed analytical methods have been changed to these EPA approved analytical methods. Please clarify.

Response:

The analytical methodology used for 1,4 dioxane analysis has been the subject of much discussion culminating in a detection limit study by the laboratory used by Los Angeles By-Products. Following the EPA review of the detection limit study, comments regarding the study from CH2M Hill were contained in a Technical Memorandum dated June 1, 2007.

The comments required that an additional detection limit study be performed by the laboratory or the samples be analyzed by one of three suggested laboratories. Subsequent groundwater samples were sent by American Scientific Laboratories ("ASL") to Severn Trent Laboratories (now known as TestAmerica) in Sacramento, California.

The next groundwater sampling event after receiving the June comments from CH2M Hill was in September of 2007. The groundwater samples were submitted to ASL who forwarded the samples to TestAmerica (Severn Trent) for 1,4-dioxane analysis by EPA Method 8270C-SIM. ASL then received the data from TestAmerica and put the results and QA/QC results on their own letterhead. Enclosed as Appendix A are the original laboratory data sheets from Test America to show that the samples were in actuality analyzed by the approved laboratory.

Enclosed as Attachment 1 are Tables 2, 3 and 2-2 which indicate that 1,4-dioxane is to be analyzed by EPA Method 8270C-SIM and 1,2,3-trichloropropane is to be analyzed by either EPA Methods 524.2-Sim or 8270C-Mod.

Comment:

4) ***The laboratory QAPP provided as an attachment to the project QAPP does not include some analytes/methods, including several emerging contaminants (NDMA, 1,2,3-TCP, 1,4-dioxane, and perchlorate). Therefore, there are no method quality objectives defined for these analytes. Please provide a summary table of quality assurance objectives for all methods/analytes, including the emerging contaminants, summarizing: analyte (individually or grouped), method, target detection limit, analytical accuracy, analytical precision, and overall completeness. See the attached table for an example of the recommended structure (Attachment B).***

Response:

Table 2-2 has been added to the QAPP. The enclosed Attachment 1 contains this new table. The requested parameters are highlighted in yellow.

Comment:

5) SAP Section 2.2.2, does not include collection of matrix spikes or matrix spike duplicates (MS/MSDs). The QAPP briefly mentions MS/MSDs, but it is more of a reference to the laboratory QAPP, which has no bearing on requirements of the field scope of work. Please modify the QAPP to include one MS/MSD per 20 samples collected, or one pair per collection event if less than 20 samples are collected.

Response:

Page 7, Section 2.2.2 Number of Samples of the Revised January 24, 2007 Sampling and Analysis Plan has the following paragraph added:

"Laboratory quality control (QC) samples (MS/MSDs) will be collected for all analyses for every 20 samples or at least once for each sampling event. A total of one MS/MSDs will be collected during each sample event."

Comment:

6) The QAPP does not define the project organization. Please include a summary of key project personnel, their responsibilities, and contact information in the QAPP.

Response:

Section D1, Project Organization has been added to pages 8 and 9 of the QAPP. This section reads as follows:

D2 Project Organization

Name	Project Role
David Bauer QEP #1194029 REA II #20203 CPC	Principal Environmental Consultant (Quality Assurance, Technical Policy Analysis)
David Broadbent REA I #00122	Technical Director/Sr. Project Manager (Regulatory Compliance, Work Plan Development, Quality Control, Site Management, Health and Safety Planning, Groundwater Monitoring)
Craig Williams PG #6895 (California)	Supervising Project Geologist

All personnel can be reached at Targhee, 562-435-8080.

Comment:

7) SAP Table 1 contains discrepancies in the rationale for data quality objectives. The SAP text states that there are no historical exceedences of DHS action levels, except for TDS. Table 1 then states that some compounds to be monitored, such as metals, are due to DHS exceedences. Please review the data quality objectives and correct or explain any apparent discrepancies.

Response:

The verbiage "above DHS action levels" has been removed from Table 1. The term "been detected in California groundwater" (original verbiage) remains since these constituents have been detected in groundwater throughout the State of California and, thus, the rationale for their monitoring. Enclosed in Attachment 1 is the Revised Table 1 from the Revised January 24, 2007 SAP.

Comment:

8) SAP Section 2.4.6.3 should include adding custody seals to all coolers, unless they will be delivered by sampling personnel directly to the laboratory. Please revise this section accordingly.

Response:

The following highlighted verbiage has been added to Page 18, Section 2.4.6.3 of the January 24, 2007 SAP:

The coolers will then be delivered to the state-certified laboratory by the sampling team or picked up by the laboratory courier. In the event that the coolers are not picked up by the laboratory courier or delivered directly to the certified laboratory, the coolers will be sealed with custody tape.

A copy of Page 18 is enclosed as Attachment 2 for your review.

Comment:

9) Table 2 should include alkalinity and sulfide. Please revise this table accordingly.

Response:

Enclosed as Attachment 1 is a revised Table 2 from the January 24, 2007 Revised SAP. Alkalinity and sulfide have been added to Table 2, and highlighted.

Comment:

10) Table 3 should include alkalinity. Please revise this table accordingly.

Response:

Enclosed as Attachment 1 is a revised Table 3 from the January 24, 2007 Revised SAP. Alkalinity has been added to Table 3 and highlighted.

Comment:

11) On Table 3, note that the holding times for 1,4-dioxane, NDMA, and 123-TCP do not account for the differences between the

extraction time and analysis time. Please check this table and make any required corrections.

Response:

Enclosed as Attachment 1 is a revised Table 3 from the January 24, 2007, Revised SAP. The holding time for 1,4-Dioxane and NDMA have been changed to <7 days for extraction and <40 days for analysis. The TCP hold time has been changed to <14 days for analysis. Extraction or freezing of the samples for TCP analysis is not allowed since the analysis is purge and trap.

Comment:

12) SAP page 7, 2nd paragraph, should specify that all samples be chilled to temperature requirements regardless of other preservatives used. Please revise this paragraph accordingly.

Response:

The text in Section 2.3.1 Analytical Parameters from the original SAP states: For parameters that do not require preservatives in the sample container (See Table 3), the samples will be chilled to 4°C immediately upon collection. The type and number of sample containers are shown on Table 3.

This section has been revised in the January 24, 2007 Revised SAP to read: All samples will be chilled to 4°C immediately upon collection. The type and number of sample containers are shown on Table 3.

Additionally, the preservative column on Table 3 indicates that all samples are to be chilled to 4°C.

The page from the revised SAP with the revised language is included as Attachment 1.

Comment:

13) SAP page 7, 3rd paragraph, should not specify that a pH meter be used during the collection of VOC samples. Instead, we suggest that the standard method preservation process for bottle preparation be used by the laboratory and that all samples be preserved in the field using pre-preserved bottles only. The laboratory must verify the preservation upon receipt and notify the client of possible issues. Please revise this paragraph accordingly.

Response:

As stated in the SAP, all sampling containers used for the collection of and subsequent analysis of groundwater will be supplied by the analytical laboratory and contain the required preservative. The following verbiage is contained in the January 24, 2007 Revised SAP, Section 2.3.1 Analytical Parameters:

"The laboratory will verify that the groundwater samples are properly preserved upon receipt of the samples. If the samples were not properly preserved, the samples will either have additional preservative added, the holding time decreased, or the sampling team manager will be notified that new samples are required for analysis."

"In the event that the samples were not properly preserved, the required volume of preservative will be determined by the laboratory and added to the sampling containers used for all subsequent sampling events. The laboratory will notify the sampling team of the new preservative requirements."

The use of the pH meter in sample preservation (Section 2.3.1) reads as follows:

"Low concentration water samples to be analyzed for volatile organic compounds (including 1,2,3-trichloropropane) will be collected in 40-mL glass vials. 1:1 hydrochloric acid (HCl) will be added to the vial by the laboratory prior to sample collection. During purging, the pH will be measured using a pH meter to test at least one vial at each sample location to ensure sufficient acid is present to result in a pH of <2. The tested vial will be discarded. If the pH is >2, additional HCl will be added to the sample vials. Another vial will be pH tested to ensure the pH is less than 2. The tested vial will be discarded. The vials will be filled so that there is no headspace. The samples will be chilled to 4°C immediately upon collection."

The purpose of measuring the pH of the groundwater to be sampled is to ensure that sufficient preservative is added to the sample. As stated in the above paragraph, the pH determination is conducted on a test vial using **purge water**. After the proper amount of preservative is determined, that amount of preservative is then used in the actual sample vials, which will not have the pH determined in the field.

Historic sampling of the groundwater under the landfills indicates that the standard volume of preservatives added to the sample containers by the laboratory is sufficient to attain the pH required for preservation. Therefore, the field pH verification of the preservative quantity on the purge water is only conducted the first time the groundwater is sampled and, therefore, not routinely performed during subsequent sampling events. In the event the laboratory reports that the samples did not contain enough preservative (which has not happened), the laboratory will determine the proper volume of preservative to be added to the sample container for future sampling events. As stated in the SAP, the laboratory will supply pre-preserved sample containers to be used for sampling.

Additionally, the protocol of testing the groundwater (purge) with a pH meter or pH paper to make sure that enough preservative is added is contained in the "Field Sampling Plan Template" supplied by the EPA for use in preparing Los Angeles By-Product's SAP. The template states the following:

VOLATILE ORGANIC COMPOUNDS. Low concentration water samples to be analyzed for volatile organic compounds will be collected in 40-mL glass vials. 1:1 hydrochloric acid (HCl) will be added to the vial prior to sample collection. During purging, the pH will be measured using a pH meter to test at least one vial at each sample location to ensure sufficient acid is present to result in a pH of less than 2. The tested vial will be discarded. If the pH is greater than 2, additional HCl will be added to the sample vials. Another vial will be pH tested to ensure the pH is less than 2. The tested vial will be discarded. The vials will be filled so that there is no headspace. The samples will be chilled to 4°C immediately upon collection. Three vials of each water sample are required for each laboratory.

[If requested analyses include metals, include this paragraph; otherwise delete.]

METALS. Water samples collected for metals analysis will be collected in 1L polyethylene bottles. The samples will be preserved by adding nitric acid (HNO_3) to the sample bottle. The bottle will be capped and lightly shaken to mix in the acid. A small quantity of sample will be poured into the bottle cap where the pH will be measured using pH paper. The pH must be <2. The sample in the cap will be discarded, and the pH of the sample will be adjusted further if necessary. The samples will be chilled to 4°C immediately upon collection. One bottle of each water sample is required for each laboratory.

GENERAL CHEMISTRY (WATER QUALITY) PARAMETERS. Water samples collected for water quality analysis [Specify what parameters are included. Examples include (but are not limited to) anions (nitrate-N, nitrite-N, sulfate, phosphate), total phosphorus, ammonia-N, total dissolved solids, total suspended solids, alkalinity (may include carbonate, and/or bicarbonate), hardness, cyanide, MBAS (methylene blue active substances), etc.], will be collected in [Specify size of container] polyethylene bottles. The [Specify analysis] samples will be preserved by adding [Describe preservative appropriate to each sample type] to the sample bottle. The [Specify analysis] samples will not be preserved. If preservative is added, the bottle will be capped and lightly shaken to mix in the preservative. Where the preservative affects the pH, a small quantity of sample will be poured into the bottle cap where the pH will be measured using pH paper. The pH must be within the appropriate range. The sample in the cap will be discarded, and the pH of the sample will be adjusted further if necessary. Samples will be chilled to 4°C immediately upon collection. Samples from each location that require the same preservative will be placed in the same bottle if being analyzed by the same laboratory.

This Field Sampling Template is enclosed as Attachment 3.

Comment:

14) QAPP Section A7, method blanks are required at one per analytical batch, not at 5 percent of the samples. Please revise the QAPP accordingly.

Response:

Section A7 was changed in the Revised January 24, 2007 SAP to read as follows:

"To assess laboratory contamination, laboratory method blanks will be run at a minimum frequency of one per analytical batch."

A copy of this page with the verbiage highlighted is enclosed as Attachment 4.

Comment:

15) QAPP Section A7 mentions soil gas and audit samples. This is a first mention and it is unclear if they will be collected. Please delete references to samples that are not expected to be analyzed as part of this sampling effort.

Response:

Section A7 was changed in the Revised January 24, 2007 SAP to delete all references to soil-gas and audit samples.

Comment:

16) QAPP, Section A7, please revise the completeness goals to include each analyte/matrix, rather than a sum of all analytes together.

Response:

Table 2-2 (Attachment 1) states that the completeness goal for each analyte is 90 percent. Additionally, the following verbiage has been added to Section A7 of the Revised January 24, 2007 SAP.

An overall completeness goal for this project has been set at approximately 90 percent with a completeness goal of 90 percent for each individual analyte. A copy of the revised page is enclosed as Attachment 5.

Comment:

17) QAPP, Section A10, laboratory deliverables should include a laboratory control sample, narrative, analytical batch IDs, COC, receipt logs and a cover letter in addition to those items listed. Please revise this section accordingly.

Response:

Section A10 was changed in the Revised January 24, 2007 SAP to include the additional laboratory deliverables. The new text is as follows:

"Laboratory deliverables will also include a laboratory control sample, a QA/QC narrative, analytical batch IDs, project Chain-of-Custody, receipt logs and a cover letter discussing the results of the project QA/QC."

Enclosed as Attachment 6 is the revised page from the January 24, 2007 Revised SAP.

Comment:

18) QAPP Section D1, the data validation should include references to the latest EPA National Functional Guidelines for Organic and Inorganic Data Review. Please revise this section accordingly.

Response:

Section D1 was changed in the Revised January 24, 2007 SAP to include the mandated reference. The revised text is as follows:

"The assessment will include incorporation of the data validation findings into the database by entry of data qualifiers. The assessment will also include review of quantitative DQOs (accuracy, precision, completeness, detection limits). The final report (see Section 3 of the SAP) will include an evaluation of the overall adequacy of the total measurement systems with regard to the DQO of the data generated. The data validation in general, will follow the latest EPA National Functional Guidelines for Organic and Inorganic Data Review."

Enclosed as Attachment 7 is the revised page from the January 24, 2007 Revised SAP.

In addition to the Attachments, complete copies of the Revised January 24, 2007 SAP and QAPP are enclosed in a three-ring binder for your file. It should be noted that the cover page for the original January 24, 2007 QAPP document states the revision date is January 31, 2007. This is a typographical error and should be January 24, 2007. The body of the QAPP report contains the correct January 24, 2007 revision date. Additionally, since a different printer was used to print the enclosed SAP/QAPP, the pagination and Table of Contents may not exactly match any previous versions of the SAP/QAPP or Attachments.

If you have any questions regarding this submittal, please don't hesitate to call me at 562-435-80890.

Sincerely:

Dave Broadbent
Director of Technical Services

Attachment 1

Table 1
Table 2
Table 3
Table 2-2

Table 1

Analytical Parameters and Rationale

Penrose, Newberry and Strathern Landfills
Sun Valley California
December 2006

Revised 1/23/2007

Analytical Parameter	Frequency	Rationale
Volatile Organic Compounds (VOCs)	Quarterly	Monitor volatile organic compounds which are chemicals of concern across study area. Indicator for groundwater contamination
Perchlorate	Quarterly	Monitor perchlorate concentrations that have been detected in California groundwater. Indicator potential for emerging contaminants.
Dissolved Metals (field-filtered[1])	Quarterly	Monitor metals which have been detected in California groundwater. Indicator for groundwater contamination.
Hexavalent Chromium	Quarterly	Monitor hexavalent chromium that has been detected in California groundwater. Indicator for groundwater contamination.
Cations (Ca, Mg, Na, K)	Quarterly	General groundwater quality parameters which are useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport.
1,2,3-TCP	Quarterly	Monitor 1,2,3-TCP concentrations that have been detected in California groundwater. Indicator potential for emerging contaminants.
NDMA	Quarterly	Monitor NDMA concentrations that have been detected in California groundwater. Good indicator potential for emerging contaminants.

Table 1

Analytical Parameters and Rationale

Penrose, Newberry and Strathern Landfills
Sun Valley California
December 2006

Revised 1/23/2007

1,4-Dioxane	Quarterly	Monitor 1,4-Dioxane concentrations that have been detected in California groundwater. Indicator potential for emerging contaminants.
Sulfide	Quarterly	Geochemical indicator to determine reduction/oxidation (redox) potential which can affect transport of metals, especially chromium.
Inorganic Ions Nitrate/Nitrite, Chloride, Sulfate, Fluoride	Quarterly	General groundwater quality parameters which are useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport.
Alkalinity, Bicarbonate, Carbonate Hardness	Quarterly	General groundwater quality parameters which are useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport.
Total Dissolved Solids (TDS)	Quarterly	Indicator for groundwater degradation.
Total Organic Carbon (TOC)	Quarterly	Indicator for groundwater degradation.
(1) Samples will be filtered in field using a 0.45 micron filter.		

Table 2
(Revised 1/23/2007)
Analytical Parameters, Methods and Detection Limits for Groundwater Analyses

Parameter	**Method**	**Target Detection Limit**
Volatile Organic Compounds Including MTBE	8260B	See Example Lab Sheet
Dissolved CAM Metals (field-filtered)	6010B	See Example Lab Sheet
Hexavalent Chromium	7199	0.5 µg/L
Nitrate/Nitrite Chloride Sulfate Fluoride	300.0 300.0 300.0 300.0	0.10 mg/L 1.0 mg/L 1.0 mg/L 0.10 mg/L
Perchlorate	314	4 µg/L
1,4-Dioxane	8270C-SIM	2 µg/L
NDMA	1625C/M	0.002 µg/L
1,2,3-Trichloropropane	524.2 - SIM 8270-MOD	0.005 µg/L
Total Dissolved Solids (TDS)	160.1	20.0 mg/L
Total Organic Carbon (TOC)	415.2	2.0 mg/L
Calcium Magnesium Sodium Potassium	6010B	0.25 0.25 1.00 1.00
Hardness	130.2	5.0 mg/L
Alkalinity	SM 2320	2 to 20 mg/L
Sulfide	376.2	0.01
pH	Field/manual	N/A
Electrical Conductivity	Field/manual	N/A
Temperature	Field/manual	N/A

CAM Metals Include: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc.

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Analytical Methods List Detail Report

Report Includs Method: 8260B And Sub Method: TPH-G.S

water ug/L

Method & Submethod	Description	[illegible]	[illegible]	[illegible]	[illegible]
8260B	Volatile Organic Compounds	ORG	DEF	DEF	LEVEL 2

Analytes List

Analytes	MDL	PQL	[illegible]
Acetone	2.52	5	ACE
Benzene	0.097	1	BZ
Bromobenzene (Phenyl bromide)	0.291	1	BRBZ
Bromochloromethane (Chlorobromomethane)	0.169	1	BRCLME
Bromodichloromethane (Dichlorobromomethane)	0.169	1	BDCME
Bromoform (Tribromomethane)	0.284	5	TBME
Bromomethane (Methyl bromide)	0.174	3	BRME
2-Butanone (MEK, Methyl ethyl ketone)	5.00	5	MEK
n-Butylbenzene	0.363	1	BTBZN
sec-Butylbenzene	0.338	1	BTBZS
tert-Butylbenzene	0.235	1	BTBZT
Carbon disulfide	0.463	1	CDS
Carbon tetrachloride (Tetrachloromethane)	0.144	1	CTCL
Chlorobenzene	0.176	1	CLBZ
Chloroethane	0.328	3	CLEA
2-Chloroethyl vinyl ether	0.665	5	CEVETH
Chloroform (Trichloromethane)	0.247	1	TCLME
Chloromethane (Methyl chloride)	0.174	3	CLME
2-Chlorotoluene (o-Chlorotoluene)	0.147	1	CLBZME2
4-Chlorotoluene (p-Chlorotoluene)	0.311	1	CLBZME4
1,2-Dibromo-3-chloropropane (DBCP)	0.333	5	DBCP
Dibromochloromethane	0.300	1	DBCME
1,2-Dibromoethane (EDB, Ethylene dibromide)	0.226	1	EDB
Dibromomethane	0.316	1	DBMA
1,3-Dichlorobenzene (m-Dichlorobenzene)	0.333	1	DCBZ13
1,2-Dichlorobenzene (o-Dichlorobenzene)	0.358	1	DCBZ12
1,4-Dichlorobenzene (p-Dichlorobenzene)	0.384	1	DCBZ14
Dichlorodifluoromethane	0.244	3	FC12
1,1-Dichloroethane	0.372	1	DCA11
1,2-Dichloroethane	0.182	1	DCA12
cis-1,2-Dichloroethene	0.279	1	DCE12C
trans-1,2-Dichloroethene	0.176	1	DCE12T
1,1-Dichloroethene (1,1-Dichloroethylene)	0.355	1	DCE11
1,2-Dichloropropane	0.359	1	DCPA12
1,3-Dichloropropane	0.205	1	DCPA13
2,2-Dichloropropane	0.341	1	DCPA22
1,1-Dichloropropene	0.210	1	DCP11
cis-1,3-Dichloropropene	0.122	1	DCP13C

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Analytical Methods List Detail Report

Report Include Method: 8260B And Sub Method: TPH-G.S

trans-1,3-Dichloropropene	0.100	1	DCP13T
Ethylbenzene	0.209	1	EBZ
Hexachlorobutadiene (1,3-Hexachlorobutadiene)	0.413	3	HCBU
2-Hexanone	0.944	5	HXO2
Isopropylbenzene	0.291	1	IPBZ
p-Isopropyltoluene (4-Isopropyltoluene)	0.468	1	CYMP
MTBE	0.240	2	MTBE
4-Methyl-2-pentanone (MIBK, Methyl isobutyl ketone)	1.71	5	MIBK
Methylene chloride (Dichloromethane, DCM)	4.69	5	MTLNCL
Naphthalene	0.375	1	NAPH
n-Propylbenzene	0.254	1	PBZN
Styrene	0.122	1	STY
1,1,1,2-Tetrachloroethane	0.141	1	TC1112
1,1,2,2-Tetrachloroethane	0.579	1	PCA
Tetrachloroethene (Tetrachloroethylene)	0.421	1	PCE
Toluene (Methyl benzene)	0.282	1	BZME
1,2,3-Trichlorobenzene	0.219	1	TCB123
1,2,4-Trichlorobenzene	0.451	1	TCB124
1,1,1-Trichloroethane	0.150	1	TCA111
1,1,2-Trichloroethane	0.233	1	TCA112
Trichloroethene (TCE)	0.117	1	TCE
Trichlorofluoromethane	0.294	1	FC11
1,2,3-Trichloropropane	0.303	1	TCPR123
1,2,4-Trimethylbenzene	0.451	1	TMB124
1,3,5-Trimethylbenzene	0.219	1	TMB135
Vinyl acetate	1.62	5	VA
Vinyl chloride (Chloroethene)	0.331	3	VC
o-Xylene	0.262	1	XYLO
m- & p-Xylenes	0.476	2	XYLENES1314

Surrogate Controls List

Analytes	Surrogate Accuracy	Precision	Alias
Surrogate Percent Recovery			
Bromofluorobenzene	70-120	<25	BR4FBZ
Dibromofluoromethane	70-120	<25	DBFM
Toluene-d8	70-120	<25	BZMED8

Quality Control Element List

Analytes	LCS	LCS RPD	MS	MS RPD	SM	SM RPD	ICV	CV
Benzene [BZ]			75-120	15			0-20	0-15
Chlorobenzene [CLBZ]			75-120	15			0-20	0-15
1,1-Dichloroethene (1,1-Dichloroethylene) [DCE11]			75-120	15			0-20	0-15

Analytical Methods List Detail Report

Report Includs Method: 8260B And Sub Method: TPH-G.8

MTBE [MTBE]			75-120	15				0-20	0-15
Toluene (Methyl benzene) [BZME]			75-120	15				0-20	0-15
Trichloroethene (TCE) [TCE]			75-120	15				0-20	0-15

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Analytical Methods List Detail Report

Report Includs Method: 6010B/7470A And Sub Method: LAUSD

MATRIX: WATER

Method & Submethod	Description	Laboratory	Class	Misc Code	QC Type
6010B/7470A	CCR Title 22 Metals (TTLC)	INOR	DEF	DEF	LEVEL 2

Analytes List

Analytes	MDL mg/L	PQL mg/L	Remark
AA Metals			
Mercury	0.001	0.002	HG
ICP Metals			
Antimony	0.003	0.010	SB
Arsenic	0.002	0.010	AS
Barium	0.001	0.010	BA
Beryllium	0.0005	0.005	BE
Cadmium	0.0005	0.005	CD
Chromium	0.005	0.010	CR
Cobalt	0.001	0.010	CO
Copper	0.005	0.010	CU
Lead	0.002	0.005	PB
Molybdenum	0.001	0.010	MO
Nickel	0.001	0.010	NI
Selenium	0.004	0.010	SE
Silver	0.008	0.010	AG
Thallium	0.004	0.010	TL
Vanadium	0.003	0.010	V
Zinc	0.001	0.010	ZN

Quality Control Element List

Analytes	LCS	LCS RPD	MS	MS RPD	SM	SM RPD	ICV	CV
AA Metals								
Mercury [HG]	80-120	20	70-130	30				
ICP Metals								
Antimony [SB]	80-120	20	70-130	30				
Arsenic [AS]	80-120	20	70-130	30				
Barium [BA]	80-120	20	70-130	30				
Beryllium [BE]	80-120	20	70-130	30				
Cadmium [CD]	80-120	20	70-130	30				
Chromium [CR]	80-120	20	70-130	30				
Cobalt [CO]	80-120	20	70-130	30				
Copper [CU]	80-120	20	70-130	30				
Lead [PB]	80-120	20	70-130	30				
Molybdenum [MO]	80-120	20	70-130	30				
Nickel [NI]	80-120	20	70-130	30				
Selenium [SE]	80-120	20	70-130	30				
Silver [AG]	80-120	20	70-130	30				
Thallium [TL]	80-120	20	70-130	30				
Vanadium [V]	80-120	20	70-130	30				

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Analytical Methods List Detail Report

Report Includs Method: 6010B/7470A And Sub Method: LAUSD

Zinc [ZN]							80-120	20	70-130	30						

Page 1
Date 10/23/2002
Time 12:20:44

Analytical Methods List Detail Report

Report Include Method: 7199 And Sub Method: 7199.S

WATER ug/L

Method & Submethod	Description:	Laboratory	Class	Misc Code	QC Type
7199	Hexavalent Chromium by Ion Chromatography	INOR	DEF	DEF	LCS

Analytes List

Analytes	MDL	PQL	Remark
Conventionals			
Chromium (VI)	0.144	1.000	CR6

Quality Control Element List

Analytes	LCS	LCS RPD	MS	MS RPD	SM	SM RPD	ICV	CV
Conventionals								
Chromium (VI) [CR6]	80-120	20					15	30

Table 3
Request For Analysis
Penrose, Newberry and Strathern Landfills Quarterly Groundwater Sampling Event
(Matrix Groundwater)

			Organics			Inorganics											
Specific Analysis Requested			VOC & MTBE 8260B	1,4-Dioxane 8270C-SIM	1,2,3-Trichloropropane 524.2 - SIM 8270C-Mod	NDMA 1625C	TOC 415.2	Sulfide	Perchlorate 314	Dissolved CAM* Metals 6010B	Hexavalent Chromium 7199	Nitrite/Nitrate 300	Chloride, Sulfate Fluoride 300.0	Calcium Magnesium Sodium Potassium 6010B	Alkalinity	Total Dissolved Solids	Hardness
Analytical Holding Time			< 14 Days	<7 Days Extraction <40 days analysis	<14 Days	<7 Days Extraction <40 days analysis	<28 days	<7 Days	<28 days	<180 days	<24 Hours	<48 Hours	<28 days	<28 days	<14 days	<7 days	< 6 months
Preservatives			Add 1:1 HCl to pH <2; chill to 4°C	chill to 4°C	Add 1:1 HCl to pH <2; chill to 4°C	Chill to 4°C	H_2SO_4 to pH <2; chill to 4°C	NaOH +ZNAC pH>9; chill to 4°C	Chill to 4°C	HNO_3 pH<2 chill to 4°C	Chill to 4°C	Chill to 4°C	Chill to 4°C	Chill to 4°C	Chill to 4°C	Chill to 4°C	HNO_3 pH<2 chill to 4°C
Sample Containers			3 x 40 ml VOA Vials	1 x Liter Amber Glass	3 x 40 ml VOA Vials	2 x Liter Amber Glass	1 @ 125 ml Polyethylene	1 x 500 ml Polyethylene	1 x 500 ml Polyethylene	1 x 500 ml Polyethylene	1 x 500 ml Polyethylene	1 x Liter Polyethylene					1 x 250 ml Polyethylene
Sample Location	Sample Schedule Day	Con.															
MW-4918	Day 1	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4918B	Day 1	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4927	Day 1	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Duplicate	Day 1	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MS/MSD	Day 1	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MWB (Blank)	Day 1	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4928A	Day 2	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4928C	Day 2	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MWB (Blank)	Day 2	Low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Total Containers		27	9	27	18	9	9	9	9	9	9	9	9	9	9	9
CAM Metals Include: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Mo, Ni, Se, Ag, Th, V, Zn.																	

TABLE 2-2					
Measurement Performance Criteria					
Draft Quality Assurance Project Plan for Penrose, Newberry and Strathern Landfills					
Quarterly and Annual Groundwater Sampling Events					
Parameter	**Method**	**Target Detection Limit**	**Analytical Accuracy (% Recovery)**	**Analytical Precision (Relative % Deviation)**	**Overall Completeness (%)**
Volatile Organic Compounds (VOCs) including MTBE	8260B	See Attached Sheet	75-125	+/- 15	90
N-Nitrosodimethylamine (NDMA)	1625M	2 ng/L	70-130	+/- 30	90
Perchlorate	314	4 µg/L	50-150	+/- 50	90
1,4-Dioxane	**8270-SIM**	2 µg/L	80-120	+/- 20	90
1,2,3-Trichloropropane	**524.2M - SIM 8270C - Mod**	0.0050 µg/L	80-120	+/- 20	90
Dissolved Metals	See Attached Sheet	See Attached Sheet	75-125	+/- 25	90
Hexavalent Chromnium	7199	0.5 µg/L	75-125	+/- 25	90
Inorganics					
Nitrate-N	300.0[a]	0.1 mg/L	75-125	+/- 25	90
Nitrite-N	300.0[a]	0.1 mg/L	75-125	+/- 25	90
Chloride	300.0[a]	1.0 mg/L	75-125	+/- 25	90
Sulfate	300.0[a]	1.0 mg/L	75-125	+/- 25	90
Fluoride	300.0[a]	0.1 mg/L	75-125	+/- 25	90
Hardness	130.2[a]	5.0 mg/L	75-125	+/- 25	90
Alkalinity	SM 2320[b]	2 to 20.0 mg/L	75-125	+/- 25	90
Calcium	6010B	0.25	80-120	+/- 20	90
Magnesium	6010B	0.25	80-120	+/- 20	90
Sodium	6010B	1	80-120	+/- 20	90
Potassium	6010B	1	80-120	+/- 20	90
Sulfide	376.2	0.01	<1	+/- 20	90
Total Dissolved Solids (TDS)	160.1[a]	20.0 mg/L	75-125	+/- 25	90
Total Organic Carbon (TOC)	415.2[a]	2.0 mg/L	75-125	+/- 25	90

TABLE 2-2					
Measurement Performance Criteria					
Draft Quality Assurance Project Plan for Penrose, Newberry and Strathern Landfills					
Quarterly and Annual Groundwater Sampling Events					
Parameter	**Method**	**Target Detection Limit**	**Analytical Accuracy (% Recovery)**	**Analytical Precision (Relative % Deviation)**	**Overall Completeness (%)**
pH	Field/manual	N/A	N/A	+/- 10	90
Electrical Conductivity	Field/manual	N/A	N/A	+/- 10	90
Temperature	Field/manual	N/A	N/A	+/- 10	90

[a]U.S. Environmental Protection Agency. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983.

[b]Standard Methods for the Examination of Wastewater, 17th Edition (1989).

Attachment 2

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Section 2.3.1

The coolers will then be delivered to the state- certified laboratory by the sampling team or picked up by the laboratory courier. **In the event that the coolers are not picked up by the laboratory courier or delivered directly to the certified laboratory, the coolers will be sealed with custody tape.**

- Remove all previous labels used on the cooler.
- Seal all drain plugs with tape (inside and outside).
- Place a cushioning layer of recyclable cornstarch popcorn or bubble wrap at the bottom of the cooler.
- Line the cooler with a large plastic bag to contain samples.
- Double-bag all ice in plastic bags and seal.

2.4.6.2 Packing Samples in Coolers

- Place the Chain-of-Custody (COC) form in a zip-lock bag.
- Place samples in an upright position in the cooler.
- Fill the void space between samples with recyclable cornstarch popcorn, double-bagged ice or bubble wrap.

2.4.6.3 Closing and Shipping of Coolers

- Coolers will be packed with packing material surrounding the bottles to prevent breakage during transport.
- Ice will be sealed in plastic bags to prevent melting ice from soaking the packing material.
- Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid.
- Place "This Side Up" arrows on the sides of the cooler.

The coolers will then be delivered to the state-certified laboratory by the sampling team or picked up by the laboratory courier. **In the event that the coolers are not picked up by the laboratory courier or delivered directly to the certified laboratory, the coolers will be sealed with custody tape.**

Attachment 3

EPA Supplied Field Sampling Plan

Field Sampling Plan

(Reference appropriate SOP ##, Waste Management Planning and Waste Characterization)

The purpose of the Field Sampling Plan (FSP) is to provide general direction for field sampling activities associated with collection of environmental samples at groundwater monitoring wells assisting site investigation and remediation activities. This document is composed of a Sampling and Analysis Plan (SAP) and the companion document , the Quality Assurance Project Plan (QAPP). It is a required practice for most [E2 or RAC Team Company name] waste characterization projects.

Many state regulations also require a FSP or SAP for hazardous waste treatment and clean up projects. Check with individual state environmental agencies to determine requirements.

The following is a template for writing the Sampling and Analysis Plan. Highlighted areas indicate where text must be entered.

[FACILITY NAME]
[NAME OR TYPE OF FACILITY]
[COUNTY]
[CITY, STATE]

Draft Sampling and Analysis Plan

Prepared by
[Company name]

Originally Prepared: [Date]
Last Revision: [Date]

Appendices

Tables **Page**

Insert appropriate tables from SAP

Figures

Insert appropriate figures from SAP

Abbreviations and Acronyms

This list should be revised as needed.

ASTM	American Society for Testing and Materials
bgs	below the ground surface
CAS	Chemical Abstracts Service
CLP	Contract Laboratory Program
cm^2	square centimeter(s)
COC	chain of custody
COE	U.S. Army Corps of Engineers
CRDL	contract-required detection limit
%D	percent difference
DI	deionized
DOT	U.S. Department of Transportation
DQOs	data quality objectives
Eh	oxidation/reduction potential
EPA	U.S. Environmental Protection Agency
ft	foot or feet
gpm	gallons per minute
HCID	hydrocarbon identification
ID	identification
LCS	laboratory control samples
MDL	method detection limit
µg/L	microgram(s) per liter
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
mL	milliliter(s)
MS/MSD	matrix spike/matrix spike duplicate
NAD	North American Datum
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NTU	nephelometric turbidity unit
OSHA	Occupational Safety and Health Administration
% RSD	percent relative standard deviation
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
ppm	part(s) per million
PQL	practical quantitation limit
psi	pounds per square inch
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
QAPP	*Quality Assurance Project Plan*
QASP	*Quality Assurance Sampling Plan*

RCRA	Resource Conservation and Recovery Act
RF	response factor
RI/FS	remedial investigation/feasibility study
RMC	Reynolds Metals Company
RPD	relative percent difference
RPM	[EPA] Remedial Project Manager
RSD	relative standard deviation
RT	retention time
SAP	*Sampling and Analysis Plan*
SDG	sample delivery group
SIM	selected ion mode
SIP	Site Inspection Prioritization
SOW	Statement of Work
SRM	standard reference material
SVOCs	semivolatile organic compounds
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TIC	tentatively identified compound
TLC	Teflon-lined cap
TLS	Teflon-lined septum
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TSS	total suspended solids
VOCs	volatile organic compounds

1.0 Introduction

This Sampling and Analysis Plan (SAP) was prepared by [Company name] on behalf of the [Facility] in [City, State]. The purpose of this SAP is to provide general direction for field sampling activities associated with site investigation and remediation activities. State whether this document is a companion document to previously prepared documents or if it is to be considered a stand-alone document.

Other methodologies may be incorporated in the form of addenda to the SAP, depending on site-specific conditions and requirements. Information contained in this SAP includes:

- Site history and background
- Overall scope and objective
- Geographic site organization
- Sampling methods
- Sample handling
- Chain-of-custody and shipping
- Decontamination procedures
- Project staff organization
- Data management
- Quality Assurance Project Plan (QAPP)

Work plans developed in the future to address specific project data needs will reference this Field Sampling Plan (FSP) which is designed to include the SAP and the QAPP, which appears at the end of this document. This approach will establish standard sampling and analysis protocols, reduce redundancy, and allow [Company name] staff to focus on area-specific technical issues with each new work plan.

1.1 Property Background

[Describe the location and physical setting of the facility. Include acreage, adjacent property, terrain and surroundings. Two maps of the area should be provided: the first (Figure 1.1), on a larger scale, should place the area within its geographic region; the second (Figure 1.2), on a smaller scale, should mark the sampling site or sampling areas within the local area]

1.1.1 Physical Location and Property Description

[Describe when the facility was constructed and the different processes that have taken place. Include changes in ownership.]

The site or sampling area occupies ________ [e.g., acres or square feet] in a ______________ [e.g., urban, commercial, industrial, residential, agricultural, or undeveloped] area. The site or sampling area is bordered on the north by __________, on the west by ____________, on the south by ______________, and on the east by ______________. The specific location of the site or sampling area is shown in Figure 1.2.

1.2.1 Operational History

[As applicable, describe in as much detail possible (i.e., use several paragraphs) the past and present activities at the site or sampling area. The discussion might include the following information:

- a description of the owner(s) and/or operator(s) of the site or areas near the site, the watershed of interest, the sampling area, etc. [Present this information chronologically]
- a description of past and current operations or activities that may have contributed to suspected contamination; a description of the processes involved in the operation(s) and the environmentally detrimental substances, if any, used in the processes
- a description of any past and present waste management practices. If a waste site, were/are hazardous wastes generated by one or more of the processes described earlier? If so, what were/are they, how and where were/are they stored on the site or sampling area, and where were/are they ultimately disposed of?

1.2 Summary of Site Investigations

1.2.1 Previous Investigations and Regulatory Involvement

[Describe the history of site investigations such as an RWQCB WIP Investigation or SWAT Report and date site was added to NPL – 1986 for North Hollywood OU), site investigation conducted and other inspections.]

Summarize all previous sampling efforts at the site or sampling area. Include the sampling date(s); name of the party (ies) that conducted the sampling; local, tribal, state or federal government agency for which the sampling was conducted; a rationale for the sampling; the type of media sampled (e.g., soil, sediment, water); laboratory methods that were used; and a discussion of what is known about data quality and usability.

1.2.2 Nature and Extent of Contamination

This section describes the nature and extent of contamination in soil and/or groundwater at the [Facility]. For previous data at the [Facility] these data can be presented in tables.

- Discuss the sample media (i.e., groundwater, surface water, subsurface soils, surface soils) that will be addressed during the field work. Where more than one media is to be included, use separate subsections for the descriptions.
- Describe potentially hazardous constituents that have been identified. Show where samples were collected (describe and map).
- Discuss the Contaminants of Concern (COCs) to Relate activities at this [Facility] to any other areas that are under investigation.

2.0 Sampling Operations

This section presents the objectives behind the sampling to be performed at the [facility], and it details the procedures that will be employed to satisfy these objectives.

2.1 Sampling Rational and Objectives

The purposes of the sampling program at the [facility] are to acquire area-specific data needed to locate potential sources of constituents, determine the level of risk posed by constituents at the site, assess options for remediation at the site, and verify that approved cleanup goals are achieved. [Accurately describe why the sampling is required; who is directing the sampling, and what the information will be used for.] For each sample that is collected, the analytical data provided by that sample will be used to satisfy [one or more of the following specific objectives]:

- Define the nature and extent of the constituents present.
- Evaluate risks posed by constituents present at the site.
- Characterize material for waste management purposes, such as separation or disposal.
- Make field decisions regarding work progress, additional needs, or investigation completion.
- Assess constituent migration.
- Verify compliance with remedial goals that may be defined in an Action Memorandum, Administrative Order on Consent, or related Statements of Work.

Table 2-1 lists the different sampling activities that will be performed at [facility], as well as the objective(s) that they satisfy.

2.2 Sample Locations/Number of Samples/Analytical Program

Present the remedial action goals (if any) as described in the ROD for the Operable Unit where the [facility] is located, and the treatment remedies for this [facility]. State what the data quality objectives (DQO) that were developed for this [facility] as presented in Section A7 of the QAPP [following this SAP]. Describe how the sample network (locations) and rationale (number of samples and analyses) will provide data to meet the DQOs. If needed, present how the sampling program (sample frequency, location, and analytical parameters) will be evaluated.

2.2.1 Sample Locations

Describe the locations where samples at the [facility] will be collected. Provide the rational for selection of the locations, stating the original purpose of placement of monitoring well(s) [i.e., professional judgment, physical constraints]. Include a Figure that will accurately show the sampling locations at the [facility], including boundaries of the [facility], identifying surface structures, street names (if appropriate), scale bar, North arrow and other features that are appropriate. This figure should be of a sufficient scale that locations at adjoining areas can also be accurately presented.

2.2.2 Number of Samples

State the frequency that the groundwater samples will be collected at the [facility] to monitor water quality. Provided that groundwater samples will be collected more than during a single event, provide the rationale for the frequency (e.g., as directed by EPA, to supplement treatment options, to define COCs, etc

Provide information for the types of quality assurance (QA) samples that will be collected in the form of field duplicates, field blanks, and matrix spike/matrix spike duplicate (MS/MSD) double volume samples.

At a minimum, one field duplicate will be collected for each analysis for every 10 wells sampled. For each analyte under investigation, for a total of ____ field duplicates from ____ monitoring wells at the [facility] will be collected during each sampling event.

Field blank samples will be collected to check for the possible cross-contamination of groundwater samples from the point of sample collection to the analysis of the samples by the laboratory. One field blank sample will be collected for all analytes at the first sampling location each day. Approximately ____ field blank samples (one for each field day) will be collected during each sampling event.

Laboratory quality control (QC) samples (MS/MSDs) will be collected for all analyses for every 20 samples during each sampling event. The collection of MS/MSD sample should be assigned to monitoring wells that present a range in potentially contaminated wells (if possible). A total of ____ MS/MSDs will be collected during each sample event.

With the inclusion of field QA samples, ___ groundwater samples will be collected during each sample event. If needed, this information can be presented in a table format.

Table 2-__
Groundwater Sample Collection Summary
[Site Name, Location, Date]

Event	Groundwater Samples (including MS/MSDs)	Field Duplicates	Field Blanks	Total Samples
Event 1				
Event 2				
Event 3				

2.2.3 Analytical Program

Present the analyses that are anticipated to be collected during the sampling event. Table 2-___ presents the analytical parameter along with the rationale for collecting that parameter in support of the sampling event at the [facility], [expand to include all analytical parameters that will be covered during all sampling events].

If any analytes for which there are no established MCLs (e.g., Perchlorate with low detection limits) are included, state the relevant State Action Limit and how this data will be used. [for example, perchlorate data will be used to assess the extent and magnitude of groundwater contamination and to determine whether this compound exceeds California DHS Action Levels].

The analytical services that are to be requested for these parameters are presented in the following Section with the Request-for-Analysis.

Table 2-___
Analytical Parameters and Rationale
[Site Name, Location, Date]

Analytical Parameter	Frequency	Rationale

Volatile Organic Compounds (VOCs)		Monitor volatile organic compounds which have been detected above MCLs and are contaminants of concern across study area. Good indicator for groundwater contamination
Perchlorate		Monitor perchlorate concentrations that have been detected above DHS action levels. Good indicator potential for emerging contaminants.
Dissolved Metals (field-filtered[1])		Monitor metals which have been detected above MCLs and are contaminants of concern across study area. Good indicator for groundwater contamination
Hexavalent Chromium		Monitor hexavalent chromium that has been detected and is a contaminants of concern across study area. Good indicator for groundwater contamination
Dissolved Iron & Manganese		Geochemical indicators to determine reduction/oxidation (redox) potential, which can affect transport of metals, especially chromium.
Cations (Ca, Mg, Na, K)		General groundwater quality parameters, which are useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport. Also useful for assessing treatment options.
1,2,3-TCP		Monitor 1,2,3-TCP concentrations that have been detected above MCL. Good indicator potential for emerging contaminants.
NDMA		Monitor NDMA concentrations that have been detected above DHS action levels. Good indicator potential for emerging contaminants.
1,4-Dioxane		Monitor 1,4-Dioxane concentrations that have been detected above DHS action levels. Good indicator potential for emerging contaminants.
Sulfide		Geochemical indicator to determine reduction/oxidation (redox) potential, which can affect transport of metals, especially chromium.
Silica		General groundwater quality parameter, which is useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport.
Inorganic Ions Nitrate/Nitrite, Chloride, Sulfate, Fluoride		General groundwater quality parameters, which are useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport. Also useful for assessing treatment options.
Alkalinity, Bicarbonate, Carbonate Hardness		General groundwater quality parameters, which are useful for identifying source of groundwater and geochemical conditions that may affect contaminant transport. Also useful for assessing treatment options.
Total Dissolved Solids (TDS)		Good indicator for groundwater contamination. Useful for assisting with assessing treatment options
Total Organic Carbon (TOC)		Good indicator for groundwater contamination. Useful for assisting with assessing treatment options
(1) Samples will be filtered in field using a 0.45 micron filter.		

2.3 Request for Analyses

Present the rationale for determining the Request for Analyses at the [facility]. Include a summary of the anticipated analytical parameters and the schedule during the course of the period of performance.

2.3.1 Analytical Parameters

Present the analyses requested for groundwater samples collected during the scheduled sampling event at the [facility]. If there are different analyses to be collected during discrete events, to be used for different project needs, these should be clearly stated.

State the analyses that are included in the following tables. The groundwater samples (including duplicates and blanks) collected from [facility] monitoring wells during each sampling events will be analyzed for VOCs (including MTBE), dissolved metals, hexavalent chromium, etc., etc., etc., [specify each parameter]. Table ___ summarizes the analytical parameters, test methods, and target detection limits for the groundwater and associated QC samples. Technical Specifications for the modifications to the analytical methods are found in Appendix ___ of this document. Detailed information required in the field regarding the specific analyses requested, preservatives, container requirements, and holding times sample events at the [facility] are presented in table __.

It is anticipated that all groundwater samples will be analyzed for the same constituents that were analyzed for during previous groundwater sampling events in the area of the [facility]. This will allow a comparison of the detected constituents in the groundwater to those that were previously detected. It is anticipated that all groundwater samples will be analyzed by [name of laboratory] Laboratories, a California-certified analytical laboratory.

Depending on the type of analysis (organic or inorganic) requested, and any other project-specific analytical requirements, sample bottles should be plastic (inorganics) or glass (organics), pre-cleaned (general decontamination procedures) or low-detection level pre-cleaned (extensive decontamination procedures).

[Describe the type of bottles that will be used for the project, including the cleaning procedures that will be followed to prepare the bottles for sampling.]

[If requested analyses do not require preservation, include this paragraph; otherwise delete. A separate paragraph should be included for each bottle type.]

___________ [Include all requested analysis(es), e.g., Anions, Pesticides, Semivolatile Organic Compounds]. Low concentration water samples to be analyzed for ___________ [Specify analysis(es), e.g., Semivolatile Organic Compounds] will be collected in ________ [Specify bottle type, e. g., 1-liter (L) amber glass bottles]. No preservative is required for these samples. The samples will be chilled to 4°C immediately upon collection. Two bottles of each water sample are required for each laboratory.

[If requested analyses include volatile organic compounds, include this paragraph; otherwise delete.]

VOLATILE ORGANIC COMPOUNDS. Low concentration water samples to be analyzed for volatile organic compounds will be collected in 40-mL glass vials. 1:1 hydrochloric acid (HCl) will be added to the vial prior to sample collection. During purging, the pH will be measured using a pH meter to test at least one vial at each sample location to ensure sufficient acid is present to result in a pH of less than 2. The tested vial will be discarded. If the pH is greater than 2, additional HCl will be added to the sample vials. Another vial will be pH tested to ensure the pH is less than 2. The tested vial will be discarded. The vials will be filled so that there is no headspace. The samples will be chilled to 4°C immediately upon collection. Three vials of each water sample are required for each laboratory.

[If requested analyses include metals, include this paragraph; otherwise delete.]

METALS. Water samples collected for metals analysis will be collected in 1L polyethylene bottles. The samples will be preserved by adding nitric acid (HNO_3) to the sample bottle. The bottle will be capped and lightly shaken to mix in the acid. A small quantity of sample will be poured into the bottle cap where the pH will be measured using pH paper. The pH must be <2. The sample in the cap will be discarded, and the pH of the sample will be adjusted further if necessary. The samples will be chilled to 4°C immediately upon collection. One bottle of each water sample is required for each laboratory.

GENERAL CHEMISTRY (WATER QUALITY) PARAMETERS. Water samples collected for water quality analysis [Specify what parameters are included. Examples include (but are not limited to) anions (nitrate-N, nitrite-N, sulfate, phosphate), total phosphorus, ammonia-N, total dissolved solids, total suspended solids, alkalinity (may include carbonate, and/or bicarbonate), hardness, cyanide, MBAS (methylene blue active substances), etc.], will be collected in [Specify size of container] polyethylene bottles. The [Specify analysis] samples will be preserved by adding [Describe preservative appropriate to each sample type] to the sample bottle. The [Specify analysis] samples will not be preserved. If preservative is added, the bottle will be capped and lightly shaken to mix in the preservative. Where the preservative affects the pH, a small quantity of sample will be poured into the bottle cap where the pH will be measured using pH paper. The pH must be within the appropriate range. The sample in the cap will be discarded, and the pH of the sample will be adjusted further if necessary. Samples will be chilled to 4°C immediately upon collection. Samples from each location that require the same preservative will be placed in the same bottle if being analyzed by the same laboratory.

2.3.2 Sample Identification

Each sample will be identified by a unique alphanumeric identifier (sample number). The sample number is composed of four components that indicate the following:

- Area of investigation
- Sample media and location sequence
- Depth (soil and sediment) or date (groundwater and surface water)
- QA/QC type

Groundwater samples will be identified by the well identifier, sample or well depth, and the sampling date, such as:

MWXX-000-DDDYY-*

- XX = two-digit well number, for example, MW08
- 000 = three-digit well depth, for example, MW08-027
- DDD = Julian Day
- YY = Last two digits of current year
- * = 0 for normal environmental sample
- * = 1 for field duplicate sample
- * = 2 for a rinsate blank
- * = 3 for a field trip blank, which is associated with the last VOC sample taken in the cooler to be shipped

Examples using this groundwater identification are:

- **PW10-625-05496-1:** Field duplicate sample collected from production well 10 at 625 ft below the ground surface (bgs) on the 54th day of 1996

- **MW02-024-05996-0:** Normal sample collected from monitoring well location 2, top of screened interval at 24 ft, on the 59th day of 1996

2.3.3 Schedule

[Facility] is prepared to implement the field activities described in this Field Sampling Plan within _____ days following approval and authorization. Field activities are expected to be completed within _____ working days.

Assuming standard laboratory turn-around-times, the analytical data should be available approximately ____ weeks following sample collection.

TABLE ___
Analytical Parameters, Methods, and Detection Limits
(Matrix = Water)
Groundwater Sampling
[Site Name, Location, Date]

Parameter	Method	Target Detection Limit
VOCs (including MTBE)	8260B or Modified CLP [a]	(b)
Perchlorate	314.0	4 µg/L
Dissolved Metals (field-filtered) or	CLP [f]	CLP [f]
Title 22 Metals	6010B	
Hexavalent Chromium	218.6 (same as SW846 7199)	0.5 µg/L
Cations (Ca, Mg, Na, K)	6010B	
Dissolved Iron & Manganese	6010B	
1,2,3-TCP	524	0.005 µg/L
NDMA	1625C(M)	0.005 µg/L
1,4-Dioxane	8270	0.1 ug/L
Sulfide	376.2	0.1 mg/L
Silica	6010B	10.0 ug/L
Inorganic Ions		
-Nitrate/nitrite	300.0[h]	0.1 mg/L
-Chloride	300.0[h]	1.0 mg/L
-Sulfate	300.0[h]	1.0 mg/L
-Fluoride	300.0[h]	0.1 mg/L
Total Recoverable Petroleum Hydrocarbons TRPH	418.1	5.0 mg/L
Alkalinity (bicarbonate, carbonate, hardness)	SM 2320[i]	20.0 mg/L
Total Dissolved Solids (TDS)	160.1[h]	20.0 mg/L
Total Organic Carbon (TOC)	415.2[h]	2.0 mg/L
pH	Field/manual[j] or 150.1	N/A
Electrical Conductivity	Field/manual[j] or 120.1	N/A
Temperature	Field/manual[j]	N/A
Dissolved Oxygen	Field/manual[j] or 360.1	

Insert below the revised footnotes appropriate to the analyses requested above

[a] Modified Contract Laboratory Program (CLP) procedures for lower detection limits (see Appendix E-1 of Revised QAPP for San Fernando Groundwater Monitoring Program (EPA, October 1999b).
[b] Detection limits will be lower than CLP as specified in EPA Region IX SOP 305 as presented in Appendix E-1 of Revised QAPP (October 1999).
[c] CLP procedures and quality control limits are defined in 1992 or latest statement of work (SOW) bid documents; accuracy, precision, and detection limit values are given in Appendix D of Revised QAPP for San Fernando Groundwater Monitoring Program (EPA, October 1999b).
[d] Modified CLP procerures as presented in EPA Region IX SOP No. 315 as presented in Appendix E-7 of this document.

[e] Modified SW486 Method 9056 procedures as presented in EPA Region IX SOP No. 531, as presented in Appendix E-8 of this document.
[f] Water Quality Parameters for Multi Concentration Water, June 1993. EPA CLP Inorganic SOW (ILM02.1) or later statement of work and EPA Region IX SOP No. 507 as presented in Appendix E-10 of this document.
[g] EPA 218.6 equivalent to SW 486 Method 7199 as presented in Appendix E-9 of this document.
[h] U.S. Environmental Protection Agency. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983.
J Field precision objectives are discussed in the text of the Revised SAP (October 1999)

[i] Standard Methods for the Examination of Wastewater, 17th Edition (1989).

2.4 Field Methods and Procedures

The SAP for [facility] provides information on groundwater sample collection activities, including:

- measuring water levels
- purging groundwater from monitoring wells
- measuring field water quality parameters
- sample containers and preservation
- collecting groundwater samples into containers for laboratory analysis
- decontamination
- sample packaging and shipment
- sample management procedures and documentation
- quality control samples
- disposal of investigative derived wastes

2.4.1 Depth to Groundwater

Depth to groundwater and total depth of each monitoring well at the [facility] will be measured at each location prior to sampling to establish static water levels and to determine appropriate purge volumes. The water levels will be taken using a Solinst™, or equivalent water level indicator graduated to 0.01-foot increments and recorded on the field data sheets.

2.4.2 Monitoring Well Purging

Groundwater will be purged from the monitoring wells at the [facility] before collecting groundwater samples to remove water from the well and filter pack that may not be representative of groundwater conditions in the surrounding formation. A minimum of three well casing volumes will be purged from each well using a decontaminated Grundfos Redi Flo 2™ pump before collecting groundwater samples. Additional purging may be necessary if temperature, pH, and electrical conductivity (EC) have not stabilized after purging three well casing volumes. The turbidity of the purged groundwater will also be monitored using a turbidimeter.

The volume of groundwater purged will be measured using a digital flow meter or tracking the volume in either a 5-gallon bucket. The purge water from the monitoring wells at the [facility] will be collected and transported to a certified disposal facility.

Each purge volume will be calculated as follows:

$$V = 7.48(3.14)(r^2)(D_{well}-D_{water})$$

where:

V	=	One purge volume [gallons]
7.48	=	Conversion factor [gallons/cubic foot]
3.14	=	Pi
r	=	Radius of well casing [feet]
Dwell	=	Depth of monitoring well from top of casing [feet]
Dwater	=	Depth to water from top of casing [feet]

2.4.3 Measuring Field Parameters

During well sampling at the [facility], turbidity, temperature, pH, and EC will be measured at the beginning of purging for each monitoring well, after each purge volume is removed, and immediately before and after sample collection. A conventional pH meter with a combination gel-filled electrode or equivalent will be used for field pH and temperature measurements. A multi-meter combination will be used for measurement of conductivity-temperature, dissolved oxygen (DO) and oxidation-reduction potential (ORP). Samples for all field measurements will be collected in a beaker used solely for field parameter determinations. All probes will be thoroughly rinsed with distilled water prior to and between any measurements at each sample location. Equipment used to measure field parameters will be maintained and calibrated according to manufacturer specifications. At a minimum, instruments will be calibrated daily in the morning followed with an instrument check at the completion of the day's sample collection. Calibration and any observed "drift" will be recorded in the field log book along with the equipment serial number. The equipment serial numbers will be recorded in the field log book at the beginning of the sampling events.

2.4.4 Sample Collection

Following purging, flow rates will be adjusted to minimize aeration prior to sampling. Samples will be collected into the appropriate sample container pretreated with preservative as described in Section ____. When collecting volatile samples (VOCs), the discharge rate will be reduced to a trickle during sample collection to reduce the potential for volatilization of VOCs. VOC samples will be collected with zero headspace in the 40 ml VOA vials. Vials will be checked for air bubbles by inverting. If pea-size or larger bubbles are observed, the sample will be recollected.

Sample container requirements and preservation methods for each analysis are summarized in Table _____. It is recommended that for analyses that require preservation, the sample containers be obtained pre-preserved from a certified supply source. All containers will be placed on ice and maintained at 4 degrees Celsius immediately following sample collection.

Before filling the sample containers, new disposable latex or nitrile surgical gloves will be donned to minimize potential cross contamination. Groundwater from the discharge line will be directed into the appropriate sample container. Care will be taken to minimize sample turbidity by pumping the well at a constant rate.

Dissolved metals samples will be filtered under positive pressure using a 0.45 micron filter. An in-line filter connected to the end of the dedicated polyethylene tubing and the sample collected into the pre-preserved sample container. A new disposable filter will be used for each sample. Groundwater samples collected for dissolved metals should be analyzed for total chromium using EPA Method 200.8, with a target reporting limits of 1 micrograms per liter (ug/L).

Hexavalent chromium samples should be collected as unfiltered and unpreserved. Groundwater samples collected for hexavalent chromium using EPA Method 218.6, with a target reporting limits of 0.1 micrograms per liter (ug/L).

2.4.5 Equipment Decontamination

Describe the decontamination procedures to be followed in preparing field sampling equipment for use at the [facility]. All reusable field equipment used to collect and handle groundwater samples, or collect field measurements, will be decontaminated before coming into contact with any sample for laboratory analysis. Sample collection equipment will be decontaminated before first use and between each sample. Decontamination areas will be established for cleaning equipment between sample locations. Ample amounts of tap water with a detergent (Alconox or equivalent) will be used to wash reusable sampling equipment, which will be rinsed thoroughly with tap water, followed by a deionized/distilled water rinse. All liquids generated from decontamination procedures will be contained in a temporary storage tank at the [facility].

Personal protective equipment (PPE) shall be worn in accordance with the [E2 or RAC Team Company name] *Activity-Specific Safety and Health Plan (date of plan).*

2.4.6 Sample Packaging and Shippment

- **Preparation of Sample Coolers**
    - Remove all previous labels used on the cooler.
    - Seal all drain plugs with tape (inside and outside).
    - Place a cushioning layer of recyclable cornstarch popcorn or bubble wrap at the bottom of the cooler.
    - Line the cooler with a large plastic bag to contain samples.
    - Double-bag all ice in plastic bags and seal.
- **Packing Samples in Coolers**
    - Place the chain-of-custody (COC) form in the zip-lock bag.
    - Place samples in an upright position in the cooler.
    - Fill the void space between samples with recyclable cornstarch popcorn, double-bagged ice or bubble wrap.
    - Place ice on top of and between the samples.
    - Fill the remaining voids with recyclable cornstarch popcorn or double-bagged ice.
    - Custody-seal large plastic bag containing samples and packing material.
- **Closing and Shipping of Cooler**
    - Coolers will be packed with packing material surrounding the bottles to prevent breakage during transport. Ice will be sealed in plastic bags to prevent melting ice from soaking the packing material. Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid. Coolers will be secured with packing tape and custody seals as described below.
    - Tape the cooler lid with strapping tape, encircling the cooler several times.
    - Place COC seals on two sides of the lid (one in front, and one on the side).
    - Place "This Side Up" arrows on the sides of the cooler.

The coolers will then be delivered to the appropriate laboratory by the sampling team or by overnight courier the day of sample collection. Each day's sample shipment will be reported to the Laboratory Coordinator. For Friday shipments, the Laboratory Coordinator must be contacted prior to 12 noon to coordinate with laboratories that will receive sample shipments on Saturday. Samples will only be shipped on Friday if the laboratory provides assurance that analytical holding times will not be exceeded.

The following information will be written on each sample container label with a permanent marker and will be covered with clear plastic tape:

Custody seals will be placed over the lids of each sample container. Custody seals on the volatile organic analyzer (VOA) vials will be placed around the lid to prevent covering the septum.

Immediately following sample collection, the filled sample containers with completed labels will be sealed with custody seals, placed in plastic zip-lock bags, and placed in a cooler containing ice. VOA vials (three vials per sample) will be wrapped together in bubble wrap, secured with tape, and placed into labeled plastic zip-lock bags. All other glass bottles will be bubble-wrapped and placed into labeled plastic zip-lock bags.

2.4.7 Equipment Decontamination

- Field Notebooks. Bound and numbered log books will be used to record all sampling information. Information in the logbooks will include, at a minimum, the following:
    - Name and title of the recorder, and date and time of entry
    - General description of weather conditions
    - Personnel involved with the activities
    - Photographic log, if appropriate
    - Sampling location and description
    - Location of duplicate and QC samples, date and time of collection, parameters to be analyzed, sample identification (ID) numbers, blank ID numbers, whether or not split samples were collected, if so for whom
    - Condition of well being sampled
    - Rinsing the faucet head to remove any extraneous material
    - Serial number and calibration of field instruments
    - Record of parameter values obtained during purging
    - Time of sampling
    - Sample description
    - Shipping addresses for laboratories
    - Names of visitors, their associations, and purpose of visit
    - Unusual activities such as departures from planned procedures
    - References to important telephone calls

All logs will be completed, signed, and dated by the recorder. All logs will be written with waterproof ink. Corrections will be made by crossing out the error with a single horizontal line, initialing the correction, and entering the correct information. Crossed-out information shall be readable.

Sample Labels. Each bottle will be labeled with a sample number, date and time of collection, requested analysis, and preservatives. Duplicates and blanks will be assigned unique numbers such that the laboratory will not know the identity of the sample location. All sample numbers and locations (including blanks and duplicates) will be recorded in the field notebook.

Immediately following sample collection, the filled sample containers with completed labels will be sealed with custody seals, placed in plastic zip-lock bags, and placed in a cooler containing ice. The following paperwork will be completed for all samples as appropriate:

- Sample Data and COC Forms
- Courier receipts from laboratory

EPA sample documentation procedures are presented in ______. Completed field QA/QC summary forms will be sent to the Quality Assurance Officer at the conclusion of the sampling event. Sample custody will be maintained by the field team until pickup by a representative from the contracted laboratory or overnight courier as presented in the QAPP, Section 5.1. Sample shipping information from each day will be maintained by the Task Manager.

2.4.8 Quality Control Requirements

Various types of field and laboratory QC samples and measurements will be used to verify that analytical data meet the quality assurance objectives and to assess how sampling and measurements influence data quality. Similarly, laboratory QC samples will be used to assess how a laboratory's analytical program influences data quality. This section describes the field QC samples required for this project.

QC samples will be collected or prepared to assist in determining data reliability. These QC samples include field duplicates, field blanks, and laboratory QC samples (for MS and MSDs). QC samples are normally collected from locations that are suspected to be of moderate contamination. QC samples will be collected immediately following collection and using the same procedures as the collection of the target sample.

Field Duplicates

The field duplicate is an independent sample collected as close as possible to the original sample from the same source and is used to document sampling precision. They will be labeled and packaged in the same manner as other samples, so that the laboratory cannot distinguish between samples and duplicates. Field duplicates will be collected by alternately filling sample and sample duplicate containers at a location of known or suspected contamination. Each duplicate will be taken using the same sampling and preservation method as other samples. Field duplicates will be collected at minimum frequency of one in every 10 samples.

Field Blanks

The field blanks are collected to verify that contamination is not introduced to samples during collection, handling, or shipping of the samples. Field blanks are empty sample containers that are filled with organic-free water on site during field sample collection. Field blanks are packaged and shipped to the laboratory for analysis for organic analyses and for inorganic analyses using the same preservation methods and packaging and sealing procedures used during collection of groundwater samples. Field blanks will be prepared and labeled in the same manner as the field samples and sent "blind" to the laboratory. A field blank will be collected at the first sampling location each day.

Additional Volume for Matrix Spike and Matrix Spike Duplicate Samples

MS/MSD and MS/MD samples are laboratory QC samples that are collected in the field. MS/MSD and MS/MD samples require no extra volume for solid matrices. MS/MSD samples for aqueous samples require three times the normal volume for organic analyses, and MS/MD samples require two times the normal volume for inorganic analyses. Analytical results of MS/MSD samples are used to measure the precision and accuracy of the laboratory analytical program for organic compounds, and the results of MS/MD samples are used to measure the accuracy of the analytical program for inorganic compounds. One MS/MD for inorganic compounds and one MS/MSD for organic compounds is analyzed for every 20 confirmatory investigative samples that are prepared in a single batch.

2.4.9 Disposal of Investigative-Derived Waste

It is anticipated that the following type of investigation-derived waste will be generated during sampling activities at the [facility]:

- Monitoring well purge water
- Disposable sampling equipment (paper towels, tubing, bailers, etc.)
- Disposable personal protective equipment (tyvek, if necessary, disposable gloves, etc.)

IDW generated during groundwater sampling at the [facility] consists primarily of purge water from monitoring wells. Purged well water and potentially hazardous solid wastes will be collected for later transportation to a certified disposal facility. The stored water should be characterized prior to transportation for disposal.

All protective clothing, field sampling gear, and other miscellaneous items will be collected in 3-mil plastic bags. The contents of each bag will be disposed of at an appropriate disposal facility by the hazardous waste treatment and disposal subcontractor.

3.0 Health and Safety Plan

The [facility] Health and Safety Plan developed should be developed as a companion document to the SAP and QAPP. This HSP would applies to the activities for sampling events proposed at the [facility] .

4.0 References

[Insert any references here.]

Appendix A: Sample Forms

[Insert any sample forms here.]

Appendix B: Applicable Rules and Practices

[Insert any rules and practices here.]

Appendix C: Instructions for Instrument Calibration and Field Measurements

[Insert any instructions here.]

Part II - Quality Assurance Project Plan

Contents

Attachments

Abbreviations and Acronyms

ASTM	American Society for Testing and Materials
bgs	below the ground surface
CAS	Chemical Abstracts Service
CLP	Contract Laboratory Program
cm^2	square centimeter(s)
COC	chain of custody
COE	U.S. Army Corps of Engineers
CRDL	contract-required detection limit
%D	percent difference
DI	deionized
DOT	U.S. Department of Transportation
DQOs	data quality objectives
Eh	oxidation/reduction potential
EPA	U.S. Environmental Protection Agency
ft	foot or feet
gpm	gallons per minute
HCID	hydrocarbon identification
ID	identification
LCS	laboratory control samples
MDL	method detection limit
µg/L	microgram(s) per liter
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
mL	milliliter(s)
MS/MSD	matrix spike/matrix spike duplicate
NAD	North American Datum
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NTU	nephelometric turbidity unit
OSHA	Occupational Safety and Health Act
% RSD	percent relative standard deviation
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
ppm	part(s) per million
PQL	practical quantitation limit
psi	pounds per square inch
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
QAPP	*Quality Assurance Project Plan*
QASP	*Quality Assurance Sampling Plan*

Abbreviations and Acronyms, continued

RCRA	Resource Conservation and Recovery Act
RF	response factor
RI/FS	remedial investigation/feasibility study
RPD	relative percent difference
RPM	[EPA] Remedial Project Manager
RSD	relative standard deviation
RT	retention time
SAP	*Sampling and Analysis Plan*
SDG	sample delivery group
SIM	selected ion mode
SIP	Site Inspection Prioritization
SOW	Statement of Work
SRM	standard reference material
SVOCs	semivolatile organic compounds
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TIC	tentatively identified compound
TLC	Teflon-lined cap
TLS	Teflon-lined septum
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TSS	total suspended solids
VOCs	volatile organic compounds

1.0 Introduction

This Quality Assurance Project Plan (QAPP) presents the objectives, functional activities, methods, and quality assurance/quality control (QA/QC) procedures associated with the collection and analysis of environmental samples for [facility].

This QAPP follows the U.S. Environmental Protection Agency (EPA) guidelines contained in EPA QA/R-5 (1994). Thus, the references in parentheses in the following sections correlate with the subtitles in EPA guidelines. These references are designated by letter and number.

A project/task description is presented in Section 1.0 of the SAP.

A Project Management/Data Quality Objectives

A1 Title and Approval Sheet

A2 Table of Contents

A3 Distribution List

A4 Project/Task Organization

[Describe or reference project/task organization.]

A5 Problem Definition/Background

Area-specific planning documents will provide problem definition and relevant background information.

A6 Project/Task Description

Area-specific planning documents will provide task descriptions.

A6.1 Data Needs and Uses

Analytes, methods, and reporting limits for each medium, based on project data quality objectives (DQOs), are listed in Section _____ of the SAP. In addition, if needed, the EPA DQO process may be used on a task-specific basis. The DQO process, per EPA guidelines (1994), is summarized below. If relevant, input corresponding to the individual DQO process steps listed below will be provided on a task-specific basis.

1. State the problem.
2. Identify a decision that addresses the problem.
3. Identify inputs affecting the decision.
4. Define boundaries of the study.
5. Develop decision rules.
6. Specify limits on uncertainty.

Data needs and uses may be summarized on a task-specific basis as follows:

Data Needs and Uses for Sampling Activities			
Data Type	Usage/Decision	Needed Detection Levels	Data Quality

A6.2 Data Users and Recipients

Data users include environmental scientists and risk assessors, hydrogeologists, soil scientists, and process and environmental engineers. Data recipients may include local governmental agencies, state regulatory agencies, other federal agencies, responsible parties and their consultants, various governmental or user group associations, and the community at large.

A7 Quality Objectives and Criteria for Measurement Data

The QA objective of this plan is to develop implementation procedures that will provide data of known and appropriate quality for the needs identified in the SAP and in Section ____ of this QAPP. Data quality is assessed by representativeness, comparability, accuracy, precision, and completeness. Definitions of these terms, applicable procedures, and levels of effort are described below. The applicable QC procedure, quantitative target limits, and levels of effort for assessing data quality are dictated by the intended use of the data and the nature of the analytical methods. Analytical methodology and specific data quality control procedures are discussed in Section ___. The following paragraphs describe these parameters.

Analytical parameters and applicable detection levels, analytical precision, analytical accuracy, and completeness in alignment with needs, as identified in Section ___ of the SAP and in Section A3, above, may be presented in the table format shown below for the specific areas/tasks.

Analytical Data Quality Objectives					
Parameter	Analytical Method	Target Detection Limit	Analytical Precision (Relative Percent Difference)	Analytical Accuracy (Percent Recovery)	Completeness (Percent)

Representativeness is a measure of how closely the results reflect the actual concentration or distribution of the chemical compounds in the matrix sampled. Sampling plan design, sampling techniques, and sample handling protocols (for example, for storage, preservation, and transportation) have been developed and are discussed in subsequent sections of this document. The proposed documentation will establish that protocols have been followed and sample identification and integrity assured. Field blanks and field duplicate samples, collected at a minimum frequency of 1 per sampling event or 5 percent (whichever is more frequent), will be used to assess field and transport contamination and method variation. To assess laboratory contamination, laboratory method blanks will be run at a minimum frequency of 5 percent of samples.

Comparability expresses the confidence with which one data set can be compared to another. Data comparability will be maintained using standard procedures, where available, as well as consistent methods and units. Table A-3 in the EPA guidelines lists specific parameters and the applicable method for analytes and target detection limits. Actual detection limits will depend on the sample matrix and will be reported as defined for the specific samples.

Accuracy is an assessment of the closeness of the measured value to the true value. For wastewater samples, the accuracy of chemical test results is assessed by spiking samples with known standards and establishing the average recovery. For a matrix spike, known amounts of a standard compound identical to the compounds being measured are added to the sample. For soil-vapor samples, per method limitation, audit samples (that is, known standards) will be analyzed to establish analytical accuracy. A quantitative definition of average recovery accuracy is given in Section ___. Accuracy measurement will be carried out with a minimum frequency of 1 in 20 samples analyzed.

Precision of the data is a measure of the data spread when more than one measurement has been taken on the same sample. Precision can be expressed as the relative percent difference (RPD); a quantitative definition of RPD is given in Section ___. The level of effort for precision measurements will be a minimum of 1 in 20 samples. For soil and water samples, analytical precision for organic analytes will be established per measurement of matrix spike duplicates. For inorganics, duplicate analyses will be obtained. For soil-vapor samples, analytical precision will be assessed per blank spikes as described above. Field duplicate measurements will be obtained to assess overall precision.

Completeness is a measure of the amount of valid data obtained from the analytical measurement system. A quantitative definition of completeness is given in Section ___. Under perfect conditions, completeness would be 100 percent. An overall completeness goal for this project has been set at 90 percent. The actual completeness may vary, depending on the nature of the samples. The completeness of the data will be assessed during QC reviews.

A8 Project Narrative

The following is a list of project goals and the associated procedures (incorporated by reference) to achieve that goal:

- Measuring (quantitatively and qualitatively) the success of the project or task data collection activities using procedures defined in Section A4
- Determining sampling design requirements and description B1
- Determining sample type and sampling location requirements B2
- Determining sample handling and custody requirements B3
- Selecting analytical methods B4
- Calibrating and taking performance evaluation samples for sampling and analytical methods used B5
- Determining sampling or analytical instrumentation requirements B6
- Planning for peer or readiness review prior to data collection C1

- Maintaining ongoing assessments during actual operation (oversight) C1

A9 Special Training Requirements/Certification

All project staff working on the site must be health and safety trained and must follow requirements specified in the [facility] *Activity-Specific Safety and Health Plan.*

A10 Documentation and Records

Laboratory final data package documentation will be as defined in Attachments A (for water samples) and B (for soils/sediments). Field documentation will be as described in Section ___ of the SAP.

[Describe components and format of project deliverables.]

This will likely include the following:

1. Analytical results for environmental samples and field QC samples (trip blanks, equipment blanks, field duplicates). The table will contain the following fields: batch; sample_id; date analyzed; date sampled; date lab received; date extracted; lab sample number; analysis class; analysis sequence; dilution factor; parameter name; Chemical Abstracts Service (CAS) number; concentration; qualifier; method detection limit (MDL); reporting limit matrix; percent moisture; units; lab name; and analytical method. If the field is not applicable, then it may be left blank.

2. Internal laboratory QA/QC sample results, including method blank results, matrix spike/matrix spike duplicate percent recovery results, and surrogate percent recovery. The following fields should be listed: batch; date analyzed; date extracted; lab sample number; analysis class; analysis sequence; dilution factor; parameter name; CAS number; concentration; qualifier; MDL; reporting limit; matrix; units; lab name; and analytical method.

3. Method blank association list. Each method blank should be listed, along with its associated environmental sample identifiers and laboratory identifiers.

B Measurement/Data Acquisition

B1 Sampling Process Design

Sampling process design will be identified on an area/task-specific basis.

B2 Sampling Method Requirement

Sampling methodology is described in Attachments A and B of this QAPP.

B3 Sample Handling and Custody Requirements

Sample handling and custody requirements are described in Section ____ of the SAP.

B Analytical Method Requirements

Analytical methods for groundwater and surface water analytes are described in Attachment A (for groundwater and surface water) and in Attachment B (for soils/sediments).

B5 Quality Control Requirements

For each analytical method, QC requirements have been detailed in Attachments A and B. These requirements address the following areas:

- Specific procedures
- Level of effort (frequency of runs)
- Control limits
- Corrective action requirements

Where applicable, the requirements listed above have been detailed by referencing existing standard protocols, such as EPA Contract Laboratory Program (CLP) procedures. This standardization is used to provide for data of known quality that are reproducible and comparable between different episodes and laboratories.

B6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Equipment and instruments used during sampling activities will be cleaned and properly stored upon return from the field, as detailed in Section ___ of the SAP. Malfunctions will be repaired or reported to the designated equipment specialist as soon as possible. All field instruments and sampling equipment will be stored in a manner to maintain their proficiency. Field personnel will routinely clean, calibrate, check batteries, and saturate field probes for meters to ensure their reliability for field sampling. Instruction and maintenance logs and records of repair for all field equipment will be noted in the field logbook.

Preventive maintenance is performed according to the procedures delineated in the manufacturers' instrument manuals, including lubrication, source cleaning, detector cleaning, and the frequency of such maintenance.

Precision and accuracy data are examined for trends and excursions beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to degrade, as evidenced by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet one or another of the QC criteria.

B7 Instrument Calibration and Frequency

Field instrument calibration and frequency shall be in accordance with manufacturer's specifications or as outlined in Section ___ and Appendix C of the SAP. Laboratory instrument calibration will be in accordance with methods in Sections B4 and B5, above.

B8 Inspection/Acceptance Requirements for Supplies and Consumables

Inspection requirements for supplies will be as detailed in contract forms.

B9 Data Acquisition Requirements (Nondirect Measurements)

Data acquisition requirements will include obtaining laboratory analytical reports and, as feasible, electronic data files from the laboratory.

B10 Data Management

Both the field and laboratory data will be provided to the [facility] data manager. These data will be reviewed by the project manager or appropriate personnel designated by the project manager. The data will be stored in a project file.

[Describe or reference data management.]

C Assessment/Review

C1 Assessment and Response Actions

The project manager and the review team will monitor and audit the performance of the QA procedures. When necessary, the review team will conduct field audits. Audits may be scheduled to evaluate the execution of sample identification, sample control, chain-of-custody (COC) procedures, field notebooks, sampling procedures, and field measurements.

The laboratories will be audited as necessary. If necessary, the external onsite laboratory audits will be carried out to cover analytical methodology QC procedures.

Verification of computer models and software will be conducted periodically by the entry of known data sets or programs by a computer expert not assigned to the project. Electronic and paper-based data sets will be verified by double entry, cross checking, and range checking against the known programs and models to check for correctness, reasonableness, and user competence. Verification of model and software performance will be documented in the QA/QC portion of the specific reports.

If QC audits result in detection of unacceptable conditions or data, the project manager will be responsible for initiating corrective action. The EPA Remedial Project Manager (RPM) will be notified if nonconformance is of program significance or requires special expertise not normally available to the project team. Corrective actions may include the following:

- Reanalyzing samples if holding-time criteria permit
- Resampling and analyzing
- Evaluating and amending sampling and analytical procedures
- Accepting data acknowledging level of uncertainty

C2 Reporting

Technical status reports are prepared monthly to update the RPM and EPA Region IX management on progress made and problems encountered and corrected during the past month, and to report problems, anticipated progress, and planned future activities. These reports may include the following information:

- Results of performance audits
- Results of systems audits
- Significant QA problems and recommended solutions

Following completion of data collection and analysis for the project, a final summary report will be prepared assessing overall measurement data accuracy, precision, and completeness.

D Data Validation and Usability

D1 Data Review, Validation, and Verification Requirements

Data reviews will be performed at two levels: at the laboratory and outside the laboratory by independent chemists. Outside the laboratory, ____ percent of the data will be reviewed for all quality control data; a percentage of the data will be checked for raw data as further described below.

D2 Validation and Verification Methods

Data reviews outside the laboratory will be in accordance with EPA CLP *National Functional Guidelines for Data Review* (EPA, February 1994) and with the specifications in Attachments A and B of this QAPP. _________percent of the data will be reviewed for all QC summary data presented on CLP forms, as described in Attachments A and B; a percentage of data will be reviewed for raw data (algorithm, calculation, and transcription checks) on a task-specific basis.

D3 Reconciliation with User Requirements

Following validation, the data will be assessed by the project team. The assessment will include incorporation of the data validation findings into the database by entry of data qualifiers. The assessment will also include review of quantitative DQOs (accuracy, precision, completeness, detection limits) and the preparation of a summary report to present the data results. The final report (see Section ____) will include an evaluation of the overall adequacy of the total measurement systems with regard to the DQO of the data generated. These quantitative DQOs are defined below.

Precision

If calculated from duplicate measurements, the relative percent difference can be defined as follows: (1)

$$RPD = \frac{(C_1 - C_2) \times 100}{(C_1 + C_2)/2}$$

where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

If calculated from three or more replicates, use relative standard deviation (RSD) rather than RPD: (2)

$$RSD = (s/\bar{y}) \times 100$$

where:

RSD	=	relative standard deviation
s	=	standard deviation
$\bar{y}$	=	mean of replicate analyses

Standard deviation, s, is defined as follows: (3)

$$s = \sqrt{\sum_{i=1}^{n} \frac{(y_i - \bar{y})^2}{n-1}}$$

where:

s	=	standard deviation
yi	=	measured value of the i^{th} replicate
$\bar{y}$	=	mean of replicated measurements
n	=	number of replicates

Accuracy

For measurements where matrix spikes are used, percent recovery can be calculated using the following formula: (4)

$$\% R = 100x \left[\frac{S - U}{C_{SA}} \right]$$

where:

%R	=	percent recovery
S	=	measured concentration in spiked aliquot
U	=	measured concentration in unspiked aliquot
C_{SA}	=	actual concentration of spike added

For situations where a standard reference material (SRM) is used instead of or in addition to matrix spikes, the following formula is used: (5)

$$\% R = 100x \left[\frac{C_m}{C_{SRM}} \right]$$

where:

%R	=	percent recovery
C_M	=	measured concentration of SRM
C_{SRM}=		actual concentration of SRM

Completeness

Completeness is defined as follows for all measurements: (6)

$$\%C = 100x\left[\frac{V}{T}\right]$$

where:

%C	=	percent completeness
V	=	number of measurements judged valid
T	=	total number of measurements

Detection Limit

The method detection limit is defined as follows for nonradionuclide measurements: (7)

$$MDL = t_{(n-1,l-a=0.99)} \times S$$

where:

MDL	=	method detection limit
S	=	standard deviation of the replicated analyses
$t_{(n-1,\ 1-a=0.99)}$	=	students' t-level and a standard deviation estimate with n-1 degree of freedom

Attachment A

Analytical Statement of Work for Groundwater and Surface Water

ATTACHMENT A
ANALYTICAL STATEMENT OF WORK FOR GROUNDWATER AND SURFACE WATER

Contents

[Create statement for each analyte.]

[Analyte]

Analytes

[Describe analyte.]

Sample Matrices

Groundwater and surface water.

Method

[Describe or reference methods used.]

Detection Limits

- Reporting limits will be as listed in Tables __ and ___ of the SAP.
- [Describe procedure for establishing detection limits.]

QA/QC and Corrective Action Requirements

[Describe or reference requirements.]

Documentation and Deliverables

[Describe the components and formats of project deliverables.]

Attachment 4

Section A7

To assess laboratory contamination, laboratory method blanks will be run at a minimum frequency of one per analytical batch.

of effort are described below. The applicable QC procedure, quantitative target limits, and levels of effort for assessing data quality are dictated by the intended use of the data and the nature of the analytical methods. Analytical methodology and specific data quality control procedures are discussed in Section 2 and in Appendix A. The following paragraphs describe these parameters.

Analytical parameters and applicable detection levels, analytical precision, analytical accuracy, and completeness in alignment with needs, as identified in Sections 2.2 and 2.3 of the SAP and in Section A3, above, may be presented in the table format shown below for the specific areas/tasks.

Analytical Data Quality Objectives					
Parameter	Analytical Method	Target Detection Limit	Analytical Precision (Relative Percent Difference)	Analytical Accuracy (Percent Recovery)	Completeness (Percent)

Representativeness is a measure of how closely the results reflect the actual concentration or distribution of the chemical compounds in the matrix sampled. Sampling plan design, sampling techniques, and sample handling protocols (for example, for storage, preservation, and transportation) have been developed and are discussed in subsequent sections of this document. The proposed documentation will establish that protocols have been followed and sample identification and integrity assured. Field blanks and field duplicate samples, collected at a minimum frequency of 1 per sampling event or 5 percent (whichever is more frequent), will be used to assess field and transport contamination and method variation. **To assess laboratory contamination, laboratory method blanks will be run at a minimum frequency of one per analytical batch.**

Comparability expresses the confidence with which one data set can be compared to another. Data comparability will be maintained using standard procedures, where available, as well as consistent methods and units. Table A-3 in the EPA guidelines lists specific parameters and the applicable method for analytes and target detection limits. Actual detection

Attachment 5

Section A7

Completeness is a measure of the amount of valid data obtained from the analytical measurement system. A quantitative definition of completeness is given in Appendix A. Under perfect conditions, completeness would be 100 percent. An overall completeness goal for this project has been set at approximately 90 percent with a completeness goal of 90 percent for each analyte. The actual completeness may vary, depending on the nature of the samples. The completeness of the data will be assessed during QC reviews. The attached Table 2-2 presents the completeness goals for the analytes to be analyzed.

limits will depend on the sample matrix and will be reported as defined for the specific samples.

Accuracy is an assessment of the closeness of the measured value to the true value. The accuracy of chemical test result is assessed by spiking samples with known standards and establishing the average recovery. For a matrix spike, known amounts of a standard compound identical to the compounds being measured are added to the sample. A quantitative definition of average recovery accuracy is given in Appendix A. Accuracy measurement will be carried out with a minimum frequency of 1 in 20 samples analyzed.

Precision of the data is a measure of the data spread when more than one measurement has been taken on the same sample. Precision can be expressed as the relative percent difference (RPD); a quantitative definition of RPD is given in Appendix A. The level of effort for precision measurements will be a minimum of 1 in 20 samples. For water samples, analytical precision for organic analytes will be established per measurement of matrix spike duplicates. For inorganics, duplicate analyses will be obtained. Field duplicate measurements will be obtained to assess overall precision.

Completeness is a measure of the amount of valid data obtained from the analytical measurement system. A quantitative definition of completeness is given in Appendix A. Under perfect conditions, completeness would be 100 percent. An overall completeness goal for this project has been set at approximately 90 percent **with a completeness goal of 90 percent for each analyte**. The actual completeness may vary, depending on the nature of the samples. The completeness of the data will be assessed during QC reviews. **The attached Table 2-2 presents the completeness goals for the analytes to be analyzed.**

A8 Project Narrative

The following is a list of project goals and the associated procedures (incorporated by reference) to achieve that goal:

- Measuring (quantitatively and qualitatively) the success of the project or task data collection activities using procedures defined in Section A4

Attachment 6

Section A10

- Laboratory deliverables will also include a laboratory control sample, a QA/QC narrative, analytical batch IDs, project Chain-of-Custody, receipt logs and a cover letter discussing the results of the project QA/QC.

The following fields should be listed: batch; date analyzed; date extracted, lab sample number; analysis class; analysis sequence; dilution factor; parameter name; CAS number; concentration; qualifier; MDL; reporting limit, matrix; units; lab name; and analytical method.

- Method blank association list. Each method blank should be listed, along with its associated environmental sample identifiers and laboratory identifiers.

- Laboratory deliverables will also include a laboratory control sample, a QA/QC narrative, analytical batch IDs, project Chain-of-Custody, receipt logs and a cover letter discussing the results of the project QA/QC.

B Measurement/Data Acquisition

B1 Sampling Process Design

Sampling process design will be identified on an area/task-specific basis.

B2 Sampling Method Requirement

Sampling methodology is described in the SAP for this project.

B3 Sample Handling and Custody Requirements

Sample handling and custody requirements are described in Section 2 of the SAP.

B4 Analytical Method Requirements

Analytical methods for groundwater analytes are described in Section 2 and Appendix A.

B5 Quality Control Requirements

For each analytical method, QC requirements have been detailed in Appendix A. These requirements address the following areas:

- Specific procedures
- Level of effort (frequency of runs)

Attachment 7

Section D1

The assessment will include incorporation of the data validation findings into the database by entry of data qualifiers. The assessment will also include review of quantitative DQOs (accuracy, precision, completeness, detection limits). The final report (see Section 3 of the SAP) will include an evaluation of the overall adequacy of the total measurement systems with regard to the DQO of the data generated. The data validation in general, will follow the latest EPA National Functional guidelines for Organic and Inorganic Data review.

The quarterly groundwater monitoring report prepared for submittal to the EPA may contain the following:

- Results of performance audits
- Results of systems audits
- Significant QA problems and recommended solutions

An Annual Groundwater Monitoring Report will be prepared assessing overall measurement data accuracy, precision, and completeness.

D Data Validation and Usability

D1 Data Review, Validation, and Verification Requirements

Data reviews will be performed at two levels: at the laboratory and outside the laboratory by Targhee chemists.

The assessment will include incorporation of the data validation findings into the database by entry of data qualifiers. The assessment will also include review of quantitative DQOs (accuracy, precision, completeness, detection limits). The final report (see Section 3 of the SAP) will include an evaluation of the overall adequacy of the total measurement systems with regard to the DQO of the data generated. **The data validation in general, will follow the latest EPA National Functional guidelines for Organic and Inorganic Data review.**

D2 Project Organization

Name	Project Role
David Bauer QEP #1194029 REA II #20203 CPC	Principal Environmental Consultant (Quality Assurance, Technical Policy Analysis)
David Broadbent REA I #00122	Technical Director/Sr. Project Manager (Regulatory Compliance, Work Plan Development, Quality Control, Site Management, Health and Safety Planning, Groundwater Monitoring)

Appendix A

1,4-Dioxane analytical Sheets

TestAmerica

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

October 3, 2007

TestAmerica Project Number: G7I130404

Molky Brar
American Scientific Lab
2520 N. San Fernando Rd
Los Angeles, CA 90065

Dear Mr. Brar,

This report contains the analytical results for the samples received under chain of custody by TestAmerica on September 13, 2007. These samples are associated with your 35177 project.

The test results in this report meet all NELAC requirements for parameters that accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4383.

Sincerely,

David R. Alltucker
Project Manager

Jill Kellmann
Senior Project Manager

Table of Contents

TestAmerica West Sacramento Project Number G7I130404

Case Narrative

TestAmerica West Sacramento Project Number G7I130404

WATER, 8270C SIM, 1,4-Dioxane
Sample(s): 1, 2, 3, 4, 5
The matrix spike/matrix spike duplicate (MS/MSD) associated with this extraction batch has recovery outside the established control limits for 1,4-Dioxane. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control. This anomaly is most likely matrix related.

There were no other anomalies associated with this project.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ACCREDITED IN ACCORDANCE WITH nelac

TestAmerica Laboratories West Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	New York*	11666
Arizona	AZ0616	Oregon*	CA 200005
Arkansas	04-067-0	Pennsylvania	68-1272
California*	01119CA	South Carolina	87014002
Colorado	NA	Texas	TX 270-2004A
Connecticut	PH-0691	Utah*	QUAN1
Florida*	E87570	Virginia	00178
Georgia	960	Washington	C087
Hawaii	NA	West Virginia	9930C, 334
Kansas*	E10375	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Michigan	9947	USACE	NA
Nevada	CA44	USDA Foreign Plant	37-82605
New Jersey*	CA005	USDA Foreign Soil	S-46613

*NELAP accredited. A more detailed parameter list is available upon request. Updated 9/21/07

QC Parameter Definitions

QC Batch: The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

Method Blank: An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD): An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also be used to evaluate the precision of the process.

Duplicate Sample (DU): Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

Surrogates: Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

Matrix Spike and Matrix Spike Duplicate (MS/MSD): An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

Isotope Dilution: For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

Control Limits: The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

Sample Summary

TestAmerica West Sacramento Project Number G7I130404

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
J6TA7	1	204111	9/11/2007 10:40 AM	9/13/2007 10:25 AM
J6TA8	2	204112	9/11/2007 01:10 PM	9/13/2007 10:25 AM
J6TA9	3	204113	9/11/2007 08:40 AM	9/13/2007 10:25 AM
J6TCA	4	204114	9/11/2007 08:05 AM	9/13/2007 10:25 AM
J6TCC	5	204115	9/11/2007 01:15 PM	9/13/2007 10:25 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G7I130404

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client: American Scientific Labs.	Project Manager: Molky Brar	Date: 9-12-07	Chain of Custody Number: 142157
Address: 2520 N. San Fernando Road	Telephone Number (Area Code)/Fax Number: 323 223 9700 323 223 9500	Lab Number	Page 1 of 1
City: L.A. State: CA Zip Code: 90065	Site Contact	Lab Contact	
Project Name and Location (State): ASL JOB # 35177	Carrier/Waybill Number		
Contract/Purchase Order/Quote No			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis (Attach list if more space is needed): 8270C-1,4-Dioxane sim only	Special Instructions/Conditions of Receipt
204111 1 Amber	9-11-07	10:40		X									X	204112*
204112* 3 Amber		13:10		↓									X	use as ms/msd*
204113 1 Amber		8:40		↓									X	per site specific
204114 1 Amber		8:05		↓									X	REPT
204115 1 Amber		13:15		↓									X	Report with MDL/PQL

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other Normal

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Janet Chin	9.12.07	4:00	1. Received By: [signature]	9-13-07	1930
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

STL Sacramento (916) 373-5600

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT A S L PM PA LOG # 47555

LOT# (QUANTIMS ID) G7I130404 QUOTE# 35699 LOCATION WL 6B

	Initials	Date
DATE RECEIVED 9-13-07 TIME RECEIVED 1025	OA	9-13-07

DELIVERED BY ☐ FEDEX ☐ CA OVERNIGHT ☐ CLIENT ☐ AIRBORNE ☑ GOLDENSTATE ☐ DHL ☐ UPS ☐ BAX GLOBAL ☐ GO-GETTERS ☐ TAL COURIER ☐ VALLEY LOGISTICS ☐ MORGAN HILL COURIER ☐ OTHER

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☑ N/A

CUSTODY SEAL #(S) ____

SHIPPPING CONTAINER(S) ☐ TAL ☑ CLIENT ☐ N/A

TEMPERTURE RECORD (IN °C) IR 4 ☐ 5 ☑ ☐ OTHER____

COC #(S) 142157

TEMPERATURE BLANK Observed: NA Corrected:____

SAMPLE TEMPERATURE

Observed: 2 2 3 Average: 2 Corrected Average: 2

COLLECTOR'S NAME: ☐ Verified from COC ☑ Not on COC

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A

LABELED BY........

LABELS CHECKED BY........

PEER REVIEW ____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING

WETCHEM ☑ N/A

VOA-ENCORES ☑ N/A

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A

☑ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☐ N/A

☐ CLOUSEAU ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)[1] ☑ N/A

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☐ PM NOTIFIED

Notes:____

[1] Acceptable temperature range for State of Wisconsin samples is ≤4°C.

LEAVE NO SPACES BLANK. USE "N/A" IF NOT APPLICABLE.

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TestAmerica West Sacramento

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G7I130404

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB	1	3	1	1	1															
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid **s** = sulfuric acid **na** = sodium hydroxide **n** = nitric acid **zn** = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

LEAVE NO SPACES BLANK. USE "NA" IF NOT APPLICABLE.

WATER, 8270C SIM, 1,4-Dioxane

American Scientific Laboratories LLC

Client Sample ID: 204111

GC/MS Semivolatiles

Lot-Sample #...:	G7I130404-001	Work Order #...:	J6TA71AA	Matrix.........:	WATER
Date Sampled...:	09/11/07	Date Received..:	09/13/07		
Prep Date......:	09/17/07	Analysis Date..:	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.95	Method.........:	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	0.46 J	0.95	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	63	(34 - 103)

NOTE(S):

J Estimated result. Result is less than RL.

American Scientific Laboratories LLC

Client Sample ID: 204112

GC/MS Semivolatiles

Lot·Sample #...:	G7I130404-002	Work Order #...:	J6TA81AA	Matrix.........:	WATER
Date Sampled...:	09/11/07	Date Received..:	09/13/07		
Prep Date......:	09/17/07	Analysis Date..:	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.95	Method.........:	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	24	0.95	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	77	(34 - 103)

American Scientific Laboratories LLC

Client Sample ID: 204113

GC/MS Semivolatiles

Lot-Sample #...:	G7I130404-003	**Work Order #...:**	J6TA91AA	**Matrix.........:**	WATER
Date Sampled...:	09/11/07	**Date Received..:**	09/13/07		
Prep Date......:	09/17/07	**Analysis Date..:**	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.95	**Method.........:**	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	ND	0.95	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	60	(34 - 103)

American Scientific Laboratories LLC

Client Sample ID: 204114

GC/MS Semivolatiles

Lot-Sample #...:	G7I130404-004	**Work Order #...:**	J6TCA1AA	**Matrix.........:**	WATER
Date Sampled...:	09/11/07	**Date Received..:**	09/13/07		
Prep Date......:	09/17/07	**Analysis Date..:**	09/25/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.95	**Method.........:**	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	ND	0.95	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	73	(34 - 103)

American Scientific Laboratories LLC

Client Sample ID: 204115

GC/MS Semivolatiles

Lot-Sample #...:	G7I130404-005	**Work Order #...:**	J6TCC1AA	**Matrix.........:**	WATER
Date Sampled...:	09/11/07	**Date Received..:**	09/13/07		
Prep Date......:	09/17/07	**Analysis Date..:**	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.95	**Method.........:**	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	**24**	**0.95**	**ug/L**	**0.35**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	83	(34 - 103)

QC DATA ASSOCIATION SUMMARY

G7I130404

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	SW846 8270C SIM		7260264	7260207
002	WATER	SW846 8270C SIM		7260264	7260207
003	WATER	SW846 8270C SIM		7260264	7260207
004	WATER	SW846 8270C SIM		7260264	7260207
005	WATER	SW846 8270C SIM		7260264	7260207

METHOD BLANK REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130404 **Work Order #...:** J61NC1AA **Matrix.........:** WATER
MB Lot-Sample #: G7I170000-264
Prep Date......: 09/17/07
Analysis Date..: 09/24/07 **Prep Batch #...:** 7260264
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
1,4-Dioxane	ND	1.0	ug/L	SW846 8270C SIM

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	67	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130404 **Work Order #...:** J61NC1AE **Matrix.........:** WATER
LCS Lot-Sample#: G7I170000-264
Prep Date......: 09/17/07 **Analysis Date..:** 09/24/07
Prep Batch #...: 7260264
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
1,4-Dioxane	**10.0**	**2.16**	**ug/L**	**22**	**SW846 8270C S**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	70	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130404 **Work Order #...:** J61NC1AE **Matrix.........:** WATER
LCS Lot-Sample#: G7I170000-264
Prep Date......: 09/17/07 **Analysis Date..:** 09/24/07
Prep Batch #...: 7260264
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,4-Dioxane	**22**	**(14 - 43)**	**SW846 8270C SIM**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	70	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

Bold print denotes control parameters

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC/MS Semivolatiles

Client Lot #...:	G7I130404	**Work Order #...:**	J6TA81AC-MS	**Matrix.........:**	WATER
MS Lot-Sample #:	G7I130404-002		J6TA81AD-MSD		
Date Sampled...:	09/11/07	**Date Received..:**	09/13/07		
Prep Date.......:	09/17/07	**Analysis Date..:**	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.95				

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,4-Dioxane	**3.8 a**	**(14 - 43)**			**SW846 8270C SIM**
	66 a	**(14 - 43)**	21	**(0-72)**	**SW846 8270C SIM**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	65	(34 - 103)
	100	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

Prep Batch #...: 7260264
Dilution Factor: 0.95

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
1,4-Dioxane	**24**	**9.49**	**24.8**	**ug/L**	**3.8 a**		**SW846 8270C SIM**
	24	**9.46**	**30.7**	**ug/L**	**66 a**	**21**	**SW846 8270C SIM**

PERCENT RECOVERY

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

October 3, 2007

TestAmerica Project Number: G7I130405
PO/Contract:

Molky Brar
American Scientific Lab
2520 N. San Fernando Rd
Los Angeles, CA 90065

Dear Mr. Brar,

This report contains the analytical results for the samples received under chain of custody by TestAmerica on September 13, 2007. These samples are associated with your 35189 project.

The test results in this report meet all NELAC requirements for parameters that accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4383.

Sincerely,

David R. Alltucker
Project Manager

for
Jill Kellmann
Senior Project Manager

880 Riverside Parkway West Sacramento, CA 95605 tel 916.373.5600 fax 916.372.1059 www.testamericainc.com

Table of Contents

TestAmerica West Sacramento Project Number G7I130405

Case Narrative

TestAmerica West Sacramento Project Number G7I130405

WATER, 8270C SIM, 1,4-Dioxane
Sample(s): 1, 2, 3
The matrix spike/matrix spike duplicate (MS/MSD) associated with this extraction batch has recovery outside the established control limits for 1,4-Dioxane. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control. This anomaly is most likely matrix related.

There were no other anomalies associated with this project.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories West Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	New York*	11666
Arizona	AZ0616	Oregon*	CA 200005
Arkansas	04-067-0	Pennsylvania	68-1272
California*	01119CA	South Carolina	87014002
Colorado	NA	Texas	TX 270-2004A
Connecticut	PH-0691	Utah*	QUAN1
Florida*	E87570	Virginia	00178
Georgia	960	Washington	C087
Hawaii	NA	West Virginia	9930C, 334
Kansas*	E10375	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Michigan	9947	USACE	NA
Nevada	CA44	USDA Foreign Plant	37-82605
New Jersey*	CA005	USDA Foreign Soil	S-46613

*NELAP accredited. A more detailed parameter list is available upon request. Updated 9/21/07

QC Parameter Definitions

QC Batch: The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

Method Blank: An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD): An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also be used to evaluate the precision of the process.

Duplicate Sample (DU): Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

Surrogates: Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

Matrix Spike and Matrix Spike Duplicate (MS/MSD): An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

Isotope Dilution: For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

Control Limits: The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

Sample Summary

TestAmerica West Sacramento Project Number G7I130405

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
J6TCD	1	204157	9/12/2007	9/13/2007 10:25 AM
J6TCE	2	204158	9/12/2007	9/13/2007 10:25 AM
J6TCF	3	204159	9/12/2007	9/13/2007 10:25 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature viscosity, and weight

G7I130405

[redacted]

Chain of Custody Record

STL-4124 (0901)

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

Client: American Scientific Labs	Project Manager: Molky Brar	Date:	Chain of Custody Number: 142158
Address: 2520 N. San Fernando Road	Telephone Number (Area Code)/Fax Number: 323 223 9700 323 223 9500	Lab Number:	Page 1 of 1
City: L.A State: CA Zip Code: 90065	Site Contact:	Lab Contact:	
Project Name and Location (State): ASL Job # 35189	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.:			

Analysis (Attach list if more space is needed): 8260 C SIM 1,4-Dioxane Only

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	8260 C SIM 1,4-Dioxane Only	Special Instructions/ Conditions of Receipt
204157	9-12-07			↓										X	Batch w/ ASL 35177
204158	"			↓										X	
204159	"			↓										X	Report with MDL/PQL

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other Normal

QC Requirements (Specify):

1. Relinquished By: Janet Chin	Date: 9-12-07	Time: 4:00 pm	1. Received By: [signature]	Date: 9-13-07	Time: 1930
2. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

Comments:

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

STL Sacramento (916) 373 - 5600

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT ASL PM DA LOG # 47554

LOT# (QUANTIMS ID) G7I130405 QUOTE# 35699 LOCATION W6B

	Initials	Date
DATE RECEIVED 9-13-07 TIME RECEIVED 1025	AL	9-13-07

DELIVERED BY ☐ FEDEX ☐ CA OVERNIGHT ☐ CLIENT ☐ AIRBORNE ☑ GOLDENSTATE ☐ DHL ☐ UPS ☐ BAX GLOBAL ☐ GO-GETTERS ☐ TAL COURIER ☐ VALLEY LOGISTICS ☐ MORGAN HILL COURIER ☐ OTHER

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☑ N/A

CUSTODY SEAL #(S) ____

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A

TEMPERTURE RECORD (IN °C) IR 4 ☐ 5 ☑ ☐ OTHER ____

COC #(S) 142158

TEMPERATURE BLANK Observed: NA Corrected: ____

SAMPLE TEMPERATURE

Observed: 2 2 3 Average: 2 Corrected Average: 2

COLLECTOR'S NAME: ☐ Verified from COC ☑ Not on COC

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A

LABELED BY..

LABELS CHECKED BY..

PEER REVIEW ____ ☑ NA

SHORT HOLD TEST NOTIFICATION SAMPLE RECEIVING

WETCHEM ☑ N/A

VOA-ENCORES ☑ N/A

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A

☑ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☐ N/A

☐ CLOUSEAU ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☑ N/A

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☐ PM NOTIFIED

Notes: ____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

LEAVE NO SPACES BLANK. USE "N/A" IF NOT APPLICABLE.

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TestAmerica West Sacramento

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G7I130405

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB	1	1	1																	
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

LEAVE NO SPACES BLANK. USE "NA" IF NOT APPLICABLE.

WATER, 8270C SIM, 1,4-Dioxane

American Scientific Laboratories LLC

Client Sample ID: 204157

GC/MS Semivolatiles

Lot-Sample #...:	G7I130405-001	**Work Order #...:**	J6TCD1AA	**Matrix.........:**	WATER
Date Sampled...:	09/12/07	**Date Received..:**	09/13/07		
Prep Date......:	09/17/07	**Analysis Date..:**	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.94	**Method.........:**	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	**0.55 J**	**0.94**	**ug/L**	**0.35**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	61	(34 - 103)

NOTE(S):

J Estimated result. Result is less than RL.

American Scientific Laboratories LLC

Client Sample ID: 204158

GC/MS Semivolatiles

Lot-Sample #...:	G7I130405-002	Work Order #...:	J6TCE1AA	Matrix.........:	WATER
Date Sampled...:	09/12/07	Date Received..:	09/13/07		
Prep Date......:	09/17/07	Analysis Date..:	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.94	Method.........:	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	ND	0.94	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	65	(34 - 103)

American Scientific Laboratories LLC

Client Sample ID: 204159

GC/MS Semivolatiles

Lot-Sample #...:	G7I130405-003	Work Order #...:	J6TCF1AA	Matrix.........:	WATER
Date Sampled...:	09/12/07	Date Received..:	09/13/07		
Prep Date......:	09/17/07	Analysis Date..:	09/24/07		
Prep Batch #...:	7260264				
Dilution Factor:	0.94	Method.........:	SW846 8270C SIM		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dioxane	ND	0.94	ug/L	0.35

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	65	(34 - 103)

QC DATA ASSOCIATION SUMMARY

G7I130405

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	SW846 8270C SIM		7260264	7260207
002	WATER	SW846 8270C SIM		7260264	7260207
003	WATER	SW846 8270C SIM		7260264	7260207

METHOD BLANK REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130405 **Work Order #...:** J61NC1AA **Matrix.........:** WATER
MB Lot-Sample #: G7I170000-264
Prep Date......: 09/17/07
Analysis Date..: 09/24/07 **Prep Batch #...:** 7260264
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
1,4-Dioxane	ND	1.0	ug/L	SW846 8270C SIM

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	67	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130405 **Work Order #...:** J61NC1AE **Matrix.........:** WATER
LCS Lot-Sample#: G7I170000-264
Prep Date......: 09/17/07 **Analysis Date..:** 09/24/07
Prep Batch #...: 7260264
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
1,4-Dioxane	**10.0**	**2.16**	**ug/L**	**22**	**SW846 8270C S**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	70	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130405 **Work Order #...:** J61NC1AE **Matrix.........:** WATER
LCS Lot-Sample#: G7I170000-264
Prep Date......: 09/17/07 **Analysis Date..:** 09/24/07
Prep Batch #...: 7260264
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,4-Dioxane	22	**(14 - 43)**	**SW846 8270C SIM**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	70	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

MATRIX SPIKE SAMPLE DATA REPORT

GC/MS Semivolatiles

Client Lot #...: G7I130405 **Work Order #...:** J6TA81AC-MS **Matrix.........:** WATER
MS Lot-Sample #: G7I130404-002 J6TA81AD-MSD
Date Sampled...: 09/11/07 **Date Received..:** 09/13/07
Prep Date......: 09/17/07 **Analysis Date..:** 09/24/07
Prep Batch #...: 7260264
Dilution Factor: 0.95

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD
1,4-Dioxane	24	**9.49**	**24.8**	**ug/L**	**3.8 a**		**SW846 8270C SIM**
	24	**9.46**	**30.7**	**ug/L**	**66 a**	**21**	**SW846 8270C SIM**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Nitrobenzene-d5	65	(34 - 103)
	100	(34 - 103)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,4-Dioxane	3.8 a	(14 - 43)			SW846 8270C SIM
	56 a	(14 - 43)	21	(0-72)	SW846 8270C SIM

PERCENT RECOVERY

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

Mitsuye Morrissey
Targhee, Inc.
110 Pine Avenue, Suite 925

Long Beach, CA 90802

CLS129787/21/24

ActWgt: 5 LB
System#: 7308627/INET8010
Account#: S *********

Delivery Address Bar Code

SHIP TO: 415-972-3253 **BILL SENDER**

Ms. Rachel N. Loftin
U.S. Environmental Protection Agenc
75 Hawthorne Street, SFD-7-4

San Francisco, CA 94105

Ref # EPA Comments on LA By-Pr
Invoice #
PO #
Dept #

TRK# 0201 7904 6881 0523

FRI - 14MAR
PRIORITY OVERNIGH

94105
CA-US
SFO

WA JCCA

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TARGHEE, INC.

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